

REPORT
OF THE
DEPARTMENT OF THE NAVAL SERVICE
FOR THE
FISCAL YEAR ENDING MARCH 31, 1914

PRINTED BY ORDER OF PARLIAMENT.



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EXCELLENT MAJESTY

1914

*To Field Marshal His Royal Highness, Prince Arthur William Patrick Albert,
Duke of Connaught and of Strathearn, K.G., K.T., K.P., etc., etc., etc., Gov-
ernor General and Commander in Chief of the Dominion of Canada.*

MAY IT PLEASE YOUR ROYAL HIGHNESS:

I have the honour to submit herewith for the information of Your Royal Highness and the Parliament of Canada, the Fourth Annual Report of the Department of the Naval Service, being for the year ended March 31, 1914.

I have the honour to be,
Your Royal Highness's most obedient servant,

JOHN DOUGLAS HAZEN,
Minister of the Naval Service.

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R E P O R T
OF THE
DEPARTMENT OF THE NAVAL SERVICE
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OTTAWA, July 1, 1914.

Hon. J. D. HAZEN,
Minister of the Naval Service,
Ottawa.

SIR,—I have the honour to report on the Department of the Naval Service for the year ended March 31, 1914, under the following headings: 1. Naval. 2. Fisheries Protection. 3. Tidal and Current Survey. 4. Hydrographic Survey. 5. Patrol of Northern Waters. 6. Radiotelegraphs.

1.—NAVAL SERVICE.

The progress, both mental and physical, of the Cadets at the Royal Naval College at Halifax still proves most satisfactory.

The nineteen Midshipmen completed their year's training at sea in H.M.S. *Berwick*, an Imperial cruiser attached to the Fourth Cruiser Squadron, and all satisfactorily passed an examination held by the Admiralty; they then, in January, returned to the Royal Naval College for a further period of six months, at the expiration of which time they are to embark in H.M.S. *Essex* for a further period of sea training, preparatory to undergoing their examinations for the rank of Lieutenant.

Eight Cadets completed their course at the College, and embarked for a year's training in H.M.S. *Berwick* under similar arrangements as before.

An examination for the entry of Cadets to the College was held in May, 1913, but owing to this being the first examination to be held in the summer, very few candidates attended the examination, and only four qualified, who joined the College in August, 1913.

The Officers of the College report most favourably on the Cadets, who have proved most amenable to discipline, and display great keenness in their work.

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Owing to conditions now existing it has been decided to reorganize the conditions under which the Royal Naval College is conducted, and the following changes have been made: The course at the College will extend over three years instead of two as formerly, while the age of entry remains unchanged. The training given will correspond to that at the Royal Military College at Kingston, only on a Naval basis, so that graduates of the College will find themselves in a very good position to adopt either a seafaring career or to take up positions under the Government, in the Hydrographic, or Tidal and Current Survey Branches, and will also possess an excellent grounding should they wish to enter a University and take a technical degree.

Arrangements have also been concluded with the Lords Commissioners of the Admiralty whereby they agree to accept, for service in the Royal Navy each year, eight Cadets who have completed their course, provided they obtain a certain standard. These young Officers will enter the Imperial Service as Cadets, and be governed by the same rules and regulations as all other Officers in the Royal Navy.

It is expected that these changes will result in very keen competition in the examinations for entry to the Royal Naval College.

The Acting Sub-Lieutenants who were completing their courses in England for the rank of Lieutenant all succeeded in obtaining the necessary certificates, and, with the exception of one who resigned the Service, and one who was invalided out of the Service, are at present serving in ships of the Imperial Service.

Of the six Engineer Lieutenants, one deserted from the Service in England, one is at present serving in the Royal Naval College at Halifax, and the remainder are in ships of the British fleet.

No recruits have been entered during the fiscal year.

Owing to the decision of the Government not to continue H.M.C. Ships *Niobe* and *Rainbow* in full commission, the course of exercises and training for these ships has been discontinued, and they are at present manned by nucleus crews.

The health of the Navy has been generally satisfactory. The report of the Director of the Naval Service on the Naval Branch is appended at page 21.

2.—FISHERIES PROTECTION.

The following vessels were employed on Fisheries Protection service during the past year in the districts named:—

Canada.—Coast of Nova Scotia and gulf of St. Lawrence.

Gulnare, Petrel, Constance.—East coast of Nova Scotia.

Curlew.—Bay of Fundy.

Vigilant.—Great Lakes.

Restless, Falcon, Malaspina, Galiano, ¹Newington, ¹Roman.—West coast.

A continuous patrol was maintained by these vessels during the fishing season for the protection of the fisheries.

¹ Chartered vessels.

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The *Newington* was chartered from the Department of Marine and Fisheries, and the *Malaspina* and *Galiano* are the two new vessels which were constructed by the Dublin Dockyard Company at Dublin, Ireland.

The *Canada*, *Constance*, and *Petrel*, in addition to their Fisheries Protection duties, have been exercised at mine-sweeping and general duties regarding examination service, as laid down in the scheme of defence for Halifax harbour.

During the winter season, instruction in "first aid," in navigation and in signals has been given to the crews of the ships on the Atlantic coast, and the Head Schoolmaster of *Niobe* conducted classes which were well attended.

On the Atlantic coast very little illegal fishing was met with during the year, and the season on the whole was good, the fall mackerel catch in October on the east side of Prince Edward Island being exceptional, though that district was much affected by a plague of dogfish during the summer.

The report from the Great Lakes states that the season was good, and very little poaching was met with.

On the west coast the vessels kept up a vigilant patrol, and various ships were reported for contravening regulations, and were fined, and two seizures made.

The season was reported poor on the whole, owing to the light run of sockeye salmon, and the belated arrival of the fall fish.

The vessels of the Fisheries Protection Service were able, on several occasions, to render assistance to vessels in distress.

The report of Vice-Admiral C. E. Kingsmill on the Fisheries Protection Service is appended at page 26.

3.—TIDAL AND CURRENT SURVEY.

The work of the Tidal and Current Survey has been maintained during the year by means of the various tidal stations throughout the Dominion.

Two new stations were erected in British Columbia, one at Cowichan bay, and the other at Nass bay, and also two in Eastern Canada, at Chaleur bay, and Chatham, Miramichi bay, respectively, and by means of the latter stations, valuable information as regards the tidal conditions of Chaleur bay has been gathered.

Much co-operation with surveys under the direction of other departments has been carried on, resulting in the obtaining of very valuable data.

Very useful information as regards the current in the northern passes of British Columbia, notably at Seymour Narrows, has been compiled, which will appear in the Tide Tables for 1915.

In Hudson bay, observations were taken at Ashe inlet, and various points between Port Burwell and Deboucherville, and tide tables have been printed and published for Port Nelson; much useful information *re* Churchill also being obtained.

The demand for tide tables, which contain the valuable information collected by this Survey still continues to show a remarkable increase.

The report of Dr. W. Bell Dawson, Superintendent of the Tidal and Current Survey, is appended at page 35.

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4.—HYDROGRAPHIC SURVEY.

The Hydrographic Survey work, in charge of Mr. W. J. Stewart, C.E., Chief Hydrographer, continued to make satisfactory progress during the year, under the following divisions, viz.: 1. Hudson Bay. 2. Pacific Coast. 3. Lake Ontario. 4. Lower St. Lawrence. 5. Lake Superior. 6. James Bay. 7. Automatic Gauges.

The work in Hudson bay was in charge of Mr. F. Anderson, in the C.G.S. *Acadia*, a new vessel, built by Messrs. Swan, Hunter & Wigham Richardson, of Newcastle-on-Tyne, which arrived at Halifax, N.S., in July.

Surveying operations were carried on between the entrance to Port Nelson and Cape Tatnam, the shore being traversed, the edge of the shallow bank being defined, and soundings carried from 10 to 15 miles off shore. Charts embracing a very wide area off the entrance to Port Nelson have now been issued; these show the area between Nelson shoal on the north and Cape Tatnam on the south, a distance of 45 miles.

Hydrographic Survey work on the Pacific coast is carried on under the command of Captain P. C. Musgrave, in the C.G.S. *Lillooet*. Work in Malaspina strait (commenced by H.M.S. *Egeria* in 1910) was first continued, and a survey of the harbour at Alberni completed. Then the triangulation and sounding of Hecate strait was proceeded with, plans being made of Thurston bay, Selwyn inlet, Aliford bay, Pacofi, Otard bay, and Port Louis. Owing to stress of weather, work on Dixon entrance could not be proceeded with, and later on *Lillooet* returned to Hecate strait, where she finished out the season. Sounding off shore for 10 miles has been almost completed as far south as Skidegate inlet, considerable traversing done between that place and Selwyn inlet, and a survey of the latter place almost completed.

Surveying operations this year were greatly hindered by bad weather, which is very prevalent in the northern waters of British Columbia.

During the year the schooner *Naden* was built by the Wallace Shipyards, Limited, being delivered in October. This vessel is used for survey work in sheltered waters, thus leaving the *Lillooet* free for service in exposed waters.

The Lake Ontario survey was in charge of Mr. A. G. Bachand, in the C.G.S. *Bayfield*.

Operations were carried on between Port Darlington and Hamilton, with the result that a sheet covering the shore from Port Darlington to Toronto has been prepared for the engraver, and plans of several small harbours, and Toronto harbour, have been prepared and will be issued as charts.

During the season soundings were carried off shore about 12 miles, 970 miles being done from the *Bayfield*, and 585 from the boats, covering an area of 400 square miles.

Mr. Charles Savary, in the C.G.S. *Cartier*, was in charge of the work on the Lower St. Lawrence. Much survey work was completed, 975 miles of soundings being made from the *Cartier*, and 575 from the launches, covering an area of 675 square miles, in addition to 95 miles of traversing. A plan of Bersimis river was also made, and some surveying done in the Lower Traverse.

Survey work in lake Superior was conducted by Mr. H. D. Parizeau, in the C.G.S. *La Canadienne*. Much survey work was carried out, a triangulation being completed

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to connect Schreiber point and Peninsula harbour and Slate islands. As a result of the season's work a fair sheet was prepared for the engraver, embracing that portion of the lake south of the shore between Schreiger point and Pic island, as far south as a line passing east and west and distant 10 miles south of Slate islands, and a plan of Jackfish bay was also prepared.

The work performed amounted to 136 miles of traversing, 700 miles of sounding from the ship, and 550 from the boats, covering an area of 650 square miles.

The work in James bay was in charge of Mr. Paul Jobin, who, with his party, left Cochrane in June. The schooner *Chrissie C. Thomey*, which had been wintering in the mouth of the Rupert river opposite the post since the autumn of 1912, had previously been prepared for service by an advance party, but owing to the absence of a tug, and the fact that the wind and tide were continuously in opposition, this vessel could not be got out, and the work was carried out from camps, much useful information being obtained with reference to ice conditions, etc.

The automatic gauge party was in charge of Mr. Charles Price. Several new gauges, nine in number, were installed on the St. Lawrence river, to assist an investigation into the levels of the St. Lawrence river, between Montreal and Quebec. There are now eighteen automatic gauges installed, and much useful data and valuable information are being obtained from them.

The following new charts have been engraved and issued to the public during the year: No. 53, Lancaster Bar to Cornwall; No. 80, Plans of harbours in Lake Erie; No. 306, Skidegate inlet, Queen Charlotte islands.

The following photo-lithographic reprints have been made of old charts, principally Admiralty charts: No. 95, Meldrum point to St. Joseph island; No. 207, Malbaie to Goose island, St. Lawrence river; No. 405, Hudson bay and strait.

The following photo-lithographic new charts have been issued: No. 309, Stamp harbour, B.C.; No. 402, Nelson roads, Hudson bay; No. 403, Approaches to Nelson river.

The following new editions of former issues were made: No. 8, River St. Lawrence, Head of Lake St. Peter; No. 9, River St. Lawrence, Lake St. Peter; No. 19, River St. Lawrence, St. Antoine to St. Augustin; No. 22, River St. Lawrence, Montreal to Sorel; No. 23, River St. Lawrence, Sorel to Batiscan; No. 24, River St. Lawrence, Batiscan to Quebec; No. 50, River St. Lawrence, Lake St. Louis; No. 201, Atlantic coast, White island to Orignaux point.

The editions of the St. Lawrence Pilot below Quebec having become exhausted, a new one has been prepared and forwarded to the King's Printer.

The edition of the Georgian Bay and North Channel Pilot, and of the Sailing Directions of the Canadian shore of Lake Huron, having become rather out of date and almost exhausted, a new one is being compiled by Captain J. G. Boulton, R.N., Retired, and is now in the hands of the King's Printer.

Very complete reports of the work in Hudson bay, as well as that of the automatic gauges, are contained in the report of Mr. Stewart, Chief Hydrographer, which is appended at page 41.

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5.—PATROL OF NORTHERN WATERS.

In recent years the Dominion of Canada has despatched various expeditions to the Atlantic and northern waters for purposes of exploration, etc., and as the results of these expeditions have proved to be most important the Government decided in February, 1913, to send another expedition under Mr. Vilhjalmur Stefansson. This gentleman had previously headed two parties for the exploration of the northern edge of the American continent, and the results of his last expedition, notably the discovery of the White Eskimo, have been most remarkable, and he was considered to be a most suitable leader for this party.

The Departments of the Naval Service, of the Geological Survey, of Marine and Fisheries, of the Interior, and of Customs, (all being interested in the results to be obtained by this expedition), co-operated towards the fitting out and providing the personnel of this expedition, whilst the general direction of the expedition was entrusted to the Department of the Naval Service.

The main objects of the expedition are:—

To explore as great a part as possible of the million or so square miles of unknown area north of the continent of North America and west of the Parry islands.

To gather scientific information and collections in the department of oceanography, geography, geology, zoology, botany, ethnology, and archæology, and to take tidal meteorological and magnetic observations.

And the time to be occupied by the Expedition is to be three winters and four summers.

After considerable search for a suitable vessel, the *Karluk* was purchased. She then underwent a thorough overhaul and refit, to fit her for the service. Her dimensions are: Length, 125 feet 6 inches; beam, 27 feet; gross tonnage, 321; draught, 14 feet 2 inches; construction, wooden screw brigantine; and she is commanded by R. A. Bartlett, who is very experienced in the northern waters.

The C.G.S. *Karluk* sailed from Victoria, B.C., on the 17th June, 1913, for Nome, Alaska, having as pilot Captain Joseph Gosse, and arrived at Nome on the 9th July. At the latter place it was found that two additional vessels would be required, and the *Alaska*, whose dimensions are: Length, 57 feet 5 inches; draught, 6 feet 6 inches; gross tonnage, 50; beam, 17 feet; construction, wooden auxiliary schooner; and *Mary Sachs*, of the following dimensions: Length, 56 feet 6 inches; draught, 5 feet 6 inches; beam, 18 feet 1 inch; gross tonnage, 41; construction, wooden gasoline screw vessel; were obtained, they being the most suitable vessels offered.

The *Karluk* and *Mary Sachs* sailed from Nome on July 20 and, calling at Port Clarence, sailed from there on the 27th. While in Ketzebue sound, owing to a gale the vessels became separated, the *Karluk* proceeding and eventually being caught in the ice on August 2 when 30 miles southwest of Barrow, and 6 miles from land, while the *Mary Sachs* passing Point Barrow on August 15 arrived at Flaxman island on the 19th, and Collinson Point on the 27th.

The C.G.S. *Alaska* left Nome on July 19, arriving at Teller, Alaska, on the 24th. Here a few necessary repairs were completed and the vessel sailed on August 11,

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rounding Point Barrow on the 20th, and passing Flaxman island on September 6. The ship then proceeded to the eastward, but, finding no opening, returned to join the *Mary Sachs* at Flaxman island.

This year the weather conditions proved most exceptional; the wind packed the ice close along the shore, with the result that at no time was the sea clear from ice; consequently, no ships already at Herschel island were able to get out, nor did any ships succeed in reaching that harbour. The following vessels were all found to be wintering at Collinson Point, being unable to proceed in either direction for the above-mentioned reasons: *Belvedere*, *Elvira*, *Polar Bear*, *Anna Olga*, *Teddy Bear*.

At this time then, the beginning of August, the following was the disposition of the personnel of the expedition:—

Northern Division, on board C.G.S. "Karluk."—V. Stefansson, in command; G. Malloch, geologist; D. Jenness, anthropologist; B. M. Wilkins, photographer; H. Beuchat, anthropologist; A. McConnell, meteorologist; F. McKay, surgeon; S. Mamen, assistant to Mr. Malloch; W. McKinley, magnetician; L. Murray, oceanographer.

Southern Division on board C.G.S. "Alaska" and "Mary Sachs."—Dr. R. M. Anderson, in command; J. J. O'Neill, geologist; R. Chipman, topographer; J. R. Cox, topographer; F. Johansen, biologist.

From this point it will be more convenient to take the parties separately.

NORTHERN DIVISION.

C.G.S. *Karluk* was, on the 2nd August, caught in the ice off Barrow. The vessel continued to drift in the ice towards the northwest, and on August 7 clear water was reached and the ship was able to steam ahead for a day or two, but on August 12 she tied up to some heavy ice and did not again get clear; after this the ship drifted with the ice, not making much progress in any one direction.

On September 20, as the ship had not moved for over two weeks, it was therefore concluded that she was frozen in fast, and the necessity of obtaining fresh meat becoming apparent, Mr. Stefansson, with Messrs. Jenness, McConnell, and Wilkins, went ashore to hunt caribou. Shortly after landing a northeasterly gale sprang up and lasted for three days, after which the sea was discovered to be open, with no signs of the *Karluk*.

This easterly gale brought with it warm weather, and passage to the mainland at Beechey Point was not possible until September 28, when Mr. Stefansson determined to proceed to the westward, to endeavour to obtain some news of the *Karluk*.

On arrival at Cape Simpson the natives reported having seen a schooner in the ice about 12 miles off Point Tangent; a party was organized to go out to her, but the wind rose and started her off again just as the party was setting out.

No satisfactory news of her could be obtained, however, and on the 8th November Mr. Stefansson proceeded eastward again to join the southern party, and leaving, en route, Mr. Jenness at Harrison bay, for ethnological study, arrived at Collinson Point on December 14. Here the winter's work was planned, which was to include the mapping

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of the main channels of the Mackenzie delta and the sounding of the most promising of these; the geological survey of sections of the coast mountains east of the international boundary, and the sled trip over the ice, for the exploration of the Beaufort sea.

This work was at once begun, and from latest accounts received was being carried out most successfully. Later on, in February, Mr. Stefansson went to Fort Macpherson, in order to receive a mail which had been sent from Dawson city about the middle of December by the R.N.W.M.P. patrol, and to forward a mail to the department by the returning patrol.

SOUTHERN DIVISION.

The southern party, under Dr. R. M. Anderson, with the vessels *Alaska* and *Mary Sachs*, being fast in the ice, went into winter quarters at Port Collinson on September 10, and started on the winter's work.

C.G.S. "Karluk."—After the separation of Mr. Stefansson and his party from the *Karluk* in September, considerable anxiety was experienced as to the fate of that vessel and her crew, and many and various conflicting reports were received as to her having been sighted. Finally, however, the conclusion was arrived at that in all probability she would drift over to the coast of Siberia, or that, should she be abandoned, the party would endeavour to reach the north coast of Asia or Europe, and the Russian Government was accordingly asked to keep a lookout for her and render any assistance possible.

Later information, however, was received to the effect that the ship had been crushed in the ice early in January, while the crew and members of the scientific party had gone into camp on Wrangle island, with a plentiful supply of provisions. Captain R. A. Bartlett made his way over the frozen sea to the Siberia coast, and thence to Emma harbour, where the whaler *Herman* embarked him and took him to St. Michael's, Alaska, from whence he got into communication with the department.

Arrangements are now in progress to have the remainder of the party brought home from Wrangle island.

6.—RADIOTELEGRAPHY.

The number of radiotelegraph stations in the Dominion and on board Canadian ships has increased by 46, and is now 169; the following table shows the number of stations of each class now in operation, and the corresponding number last year:—

	1912-13.	1913-14.	Increase.
Government commercial stations		1	1
Coast stations	37	42	5
Government ship stations	16	21	5
Licensed ship stations	36	50	14
Licensed commercial stations	6	8	2
Licensed amateur and experimental stations	28	47	19
	123	169	46

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The total number of stations now owned by the Government is as follows:—

On West Coast chain	10
On East Coast chain	18
On Great Lakes chain	8
On Hudson Bay chain	2

The range of these stations varies from 100 to 500 miles.

In addition to these, the Marconi Company owns and operates stations at Glace Bay (range 3,000 miles), Camperdown (250 miles), Sable Island (300 miles), Pictou (100 miles), and North Sydney (100 miles).

The messages handled by the Coast stations show a very decided increase over those shown in last year's report, as will be seen by the following table, viz.:—

Service.	1912-13.		1913-14.		Comparison with 1912-13.		
	Messages.	Words.	Messages.	Words.	Increase or decrease.	Messages.	Words.
East Coast	153,843	2,704,411	145,605	2,443,145	Decrease.....	8,238	261,266
Great Lakes	2,750	52,422	9,601	219,786	Increase.....	6,851	167,364
West Coast.....	115,494	1,518,926	157,354	2,206,331	Increase	41,860	687,405
Totals.....	272,087	4,275,759	312,560	4,869,262	Net increase ...	40,473	593,503

This increase, including, as it does, a decrease of 8,238 messages on the East Coast business due to the reduced amount of traffic handled by the Pictou and Cape Bear stations, is all the more noteworthy, and emphasizes the fact that the ten stations on the West Coast (which are operated directly by the department) handled more business than the thirty stations on the East Coast and Great Lakes put together, the exact figures being:—

West Coast	messages	157,354
East Coast	"	155,206

This increase in business handled is very gratifying indeed, and testifies more eloquently than words to the very excellent work done by the General Superintendent of the Radiotelegraph Service and all his staff.

EAST COAST.

No construction was undertaken on the East Coast during the year.

Negotiations are still in progress for the acquisition of suitable sites for the new stations at Quebec and Montreal.

GREAT LAKES.

Port Arthur.—Various repairs were made to the operating-house at Port Arthur, which was then transformed into a dwelling-house, a new operating-house being built.

A second mast was also erected, and a complete duplicate set of apparatus of higher power ordered to be installed.

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The complete new station was placed in commission on August 25, 1913.

Sault Ste. Marie.—A well, cesspool, and necessary drainage system were completed and installed.

Port Burwell.—A complete new station, consisting of type No. 2 operating-house, two 185-ft. housing masts and a duplicate 10 horse-power, $5\frac{1}{2}$ k.w. radiotelegraph equipment was established at Port Burwell, and the station placed in commission in January, 1914.

Toronto Island.—An excellent site having been secured on the Marine and Fisheries reserve on Toronto island, a complete new station, consisting of a type No. 3 operating-house, two 185-foot housing masts, and a duplicate 10-horsepower, $5\frac{1}{2}$ k.w. radiotelegraph equipment was established, and the station placed in commission in January, 1914.

Kingston.—A suitable site for a station having been obtained on the Militia and Defence reserve, a complete new station, consisting of a type No. 2 operating-house, two 185-foot housing masts and a duplicate 10 horse-power, $5\frac{1}{2}$ k.w. radiotelegraph equipment, was established and the station placed in commission in January, 1914.

These stations have a normal range of 350 nautical miles over water.

WEST COAST.

Alert Bay.—The station at Alert Bay, which was begun in 1912, was placed in commission in January, 1913, though the final work, and the erection of a second mast, was not completed until June, 1913.

Cape Lazo.—Additional clearing was carried out on the site of the Cape Lazo station, and by the transferring of the Point Grey windmill to this station, means have been provided for supplying water to the two houses.

The installation of a septic tank and of permanent anchors for a No. 2 mast was also begun.

Estevan.—Various changes were made in the Estevan station, a second mast being erected and a standard "T" aerial installed.

The old operating-house was also overhauled and converted into a dwelling-house for the second operators.

Gonzales Hill.—Concrete foundations, a complete duplicate transmitter, and a further ground connection were installed at this station, and considerable improvement in the transmitted signals was found to result.

Ikeda Head.—Three permanent mast anchors were installed in lieu of the three stumps formerly used.

Pachena.—A further ground connection was installed and was found to greatly improve the transmitted signals.

Triangle Island.—A general overhaul of this station was carried out, and a new receiving equipment installed.

Point Grey.—The engine-room floor was tiled, and some of the material appertaining to the two standard masts which will be erected during the coming year was purchased.

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HUDSON BAY AND STRAITS.

On plans prepared by this department, the Department of Railways and Canals erected two radiotelegraph stations to provide communication between Hudson bay and civilization, one at Port Nelson and the other at Le Pas, Man.

These stations were placed in commission in February, 1914, and constant communication has been maintained since that date.

With a view to the erection of additional stations in Hudson bay and straits, an engineer from the Radiotelegraph Branch visited that district in the summer of 1913, but only one suitable site was discovered, namely, that for the proposed station at Asche inlet.

ASSISTANCE RENDERED TO SHIPS.

Valuable assistance has been rendered by the radiotelegraph service in many cases of disaster to shipping, etc., which has resulted in the saving both of human lives and of the actual vessels. In this connection the value of an efficient radiotelegraph service was again demonstrated during the terrible storm which devastated the Great Lakes in November, 1913.

LEGISLATION.

The Radiotelegraph Act introduced in the session of 1912-13, became law on the 6th June, 1913, though some of the clauses did not come into effect until 1st January, 1914.

Under this Act, the establishing of a radiotelegraph equipment on board certain vessels was made compulsory, some forty-one Canadian ships being affected.

The regulations which are to be issued under this Act have been framed, and will be issued very shortly. The most important of these deal with:—

1. The classification of ship stations,
2. The operators to be carried, and
3. The watches to be maintained.

Arrangements have been concluded with the Customs Department whereby the Collectors of Customs act as agents of this department for the enforcement of the provisions of the Act.

INTERNATIONAL CONFERENCE FOR THE SAFETY OF HUMAN LIFE AT SEA.

In December, 1913, an International Conference was held in London, England, to consider the establishment and enforcement of uniform regulations for the proper safeguarding of human lives at sea, the Dominion of Canada being represented by Alexander Johnston, Esq., Deputy Minister of Marine and Fisheries.

Many valuable conclusions were arrived at and regulations framed, among which the following relating to radiotelegraphy will be of interest:—

Every vessel carrying fifty or more persons must (unless specifically exempted under the conditions below) carry a radiotelegraph installation. Any Administration may, however, at its discretion authorize the following exceptions:—

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(1) Ships plying on voyages which do not take them more than one hundred and fifty miles from the shore.

(2) Ships on which the number of persons is temporarily increased beyond fifty persons by reasons of exceptional circumstances.

(3) Ships of primitive build on which it would be practically impossible to place an installation.

Watches.—The classification of the vessel determines the watches which must be maintained at the station on board her, as follows:—

Class I—Constant Watch.—All vessels carrying twenty-five passengers or more must maintain a constant watch,—

(1) If they have an average speed of more than 15 knots;

(2) If they have an average speed of more than 13 knots, have more than two hundred persons on board and ply between ports more than five hundred miles apart.

Class II—Limited Watch.—Vessels carrying twenty-five passengers which are not already covered by Class I, must maintain a constant watch for seven hours each day and for the first ten minutes of every other hour of the day.

Class III—No Fixed Watch.—Vessels not covered by classes I and II are not required to maintain any regular watch.

The provisions of classes I and II come into effect within one year, and those of class III within two years after the date the Convention was signed.

General.—The main and emergency equipments are to be as called for under the International Radiotelegraph Convention of 1912.

Rules are included for the guidance of the captain of a vessel which receives a call for distress.

Provision is made for the reporting and dissemination of information regarding ice, derelicts, and other menaces to navigation; in this connection it might be remarked that our Cape Race station occupies a strategical point, and will probably prove to be the chief bureau for the exchange of such information.

With reference to these regulations, it is observed that as the provisions of the section of the Convention dealing with the compulsory equipment of radiotelegraph apparatus on board certain ships do not coincide with those of the corresponding section of the Radiotelegraph Act, it will be necessary to amend the latter before the terms of the Convention can come into effect in the Dominion.

The report of Mr. C. P. Edwards, General Superintendent of the Government Radiotelegraph Service, is appended at page 72.

GENERAL.

I have much pleasure in expressing my satisfaction at the efficient manner in which the officers and clerks of the Department have carried out their duties during the year.

I have the honour to be, sir,

Your obedient servant,

G. J. DESBARATS,

Deputy Minister.

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STATEMENT OF APPROPRIATION ACCOUNTS for Fiscal Year 1913-14.

<i>Naval Service—</i>	
Appropriation	\$1,000,000 00
Expenditure	579,565 38
Expenditure less than appropriation	\$420,434 62
<i>Fisheries Protection Service—</i>	
Appropriation	\$375,000 00
Expenditure	343,917 17
Expenditure less than appropriation	\$31,082 83
<i>Hydrographic Survey—</i>	
Appropriation	\$390,000 00
Expenditure	309,392 11
Expenditure less than appropriation.....	\$80,607 89
<i>Radiotelegraph Service—</i>	
Appropriation	\$290,000 00
Expenditure	221,191 10
Expenditure less than appropriation.....	\$68,808 90
<i>Tidal Service—</i>	
Appropriation	\$45,000 00
Expenditure	20,037 64
Expenditure less than appropriation.....	\$24,962 36
<i>New Fisheries Protection Steamers—</i>	
Appropriation	\$320,000 00
Expenditure	240,105 17
Expenditure less than appropriation.....	\$79,894 83
<i>New Hydrographic Steamer—</i>	
Appropriation	\$150,000 00
Expenditure	117,552 96
Expenditure less than appropriation.....	\$32,447 04
<i>Patrol of the Northern Waters of Canada—</i>	
Appropriation	\$175,000 00
Expenditure	174,388 69
Expenditure less than appropriation.....	\$611 31
<i>Civil Government—</i>	
Appropriation	\$100,500 00
Expenditure	80,853 35
Expenditure less than appropriation.....	\$19,646 65
<i>Contingencies—</i>	
Appropriation	\$20,000 00
Expenditure	13,606 83
Expenditure less than appropriation.....	\$6,393 17
SUMMARY.	
Grand total appropriation	\$2,865,500 00
Grand total expenditure	2,100,610 40
Grand total expenditure less than appropriation.....	\$764,889 60

STATEMENT OF REVENUE of the Department of the Naval Service for Fiscal Year ended
March 31, 1914.

Royal Naval College—College fees, 12 cadets.....		\$ 1,200 00
Wireless apparatus licenses		131 00
Casual revenue		31,592 16
Miscellaneous revenue		574 33
Radiotelegraph revenue—		
Gonzales Hill Station	\$4,204 47	
Point Grey Station	1,904 57	
Cape Lazo Station	733 14	
Pachena Station	114 39	
Estevan Station	2,113 75	
Triangle Station	1,730 50	
Ikeda Head Station	219 67	
Digby Island Station	3,694 21	
Dead Tree Point Station	574 67	
Alert Bay Station	703 33	
Port Arthur Station	5 60	
Magdalen Islands Station	318 42	
Tobermory Station	34	
Midland Station	3 31	
Point Edward Station	3 42	
Sault Ste. Marie Station	14 88	
		<hr/> 16,338 67
Total		<hr/> \$49,836 16

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REPORT OF THE NAVAL BRANCH.

OTTAWA, April 1, 1914.

The Deputy Minister,
Department of the Naval Service,
Ottawa.

SIR,—I have the honour to forward herewith the annual report of the Naval Branch of the Department of the Naval Service for the year ending March 31, 1914.

ROYAL NAVAL COLLEGE.

The nineteen Midshipmen who, through the courtesy of the Admiralty were undergoing a year's training afloat in H.M.S. *Berwick*, a cruiser attached to the Fourth Cruiser Squadron, completed their year's training in January, 1914, and returned to the College for a further period of six months. These young Officers underwent examinations under the direction of Imperial Officers, and all acquitted themselves very satisfactorily, the Lords Commissioners of the Admiralty expressing their pleasure at the good results attained, and paying tribute to the careful and painstaking training at the College and on board H.M.S. *Berwick*. Arrangements have now been completed for these Midshipmen to embark in H.M.S. *Essex* for a further period of training at sea, preparatory to undergoing their examinations for the rank of Lieutenant. These young Officers have all shown great improvement, both educational and physical, except in one case, which resulted in the Midshipman being invalided out of the Service.

The eight Cadets who joined the College in January, 1912, completed their course of training at the College in December, 1913, and arrangements having been made with the Admiralty as before, embarked for a year's training in H.M.S. *Berwick* at sea.

In May, 1913, an examination was held for the entry of Cadets, but, owing to the fact that this was the first examination to be held in the summer, and that it was not found possible to give notice of the change very far in advance, only four candidates qualified, and these joined the College in August.

There are at present eighteen Midshipmen and twelve Cadets undergoing training at the College. The rapid improvement made by these young Officers both in their mental and physical qualities, continues to manifest itself and will, it is anticipated, be a means of attracting more candidates for entry into the College.

Owing to the fact that the department has no means of continuing the naval training of Cadets after the completion of their College course, it was decided to reorganize the conditions under which the College was conducted, and the following changes have been made: The course at the College will extend over three years instead of two, as formerly, while the age of entry remains unchanged. The training given will correspond to that at the Royal Military College at Kingston, only on a Naval basis, so that graduates of the College will find themselves in a very good position to adopt either a seafaring career or to take up positions under the Government, in the Hydrographic, or Tidal and Current Survey Branches, and will also possess an excellent grounding should they wish to enter a University and take a technical degree.

Arrangements have also been concluded with the Lords Commissioners of the Admiralty whereby they agree to accept, each year, for service in the Royal Navy, eight Cadets who have completed their course, provided they obtain a certain standard.

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These young Officers will enter the Imperial Service as Cadets, and be governed by the same rules and regulations as all other Officers in the Royal Navy.

It is expected that these changes will result in very keen competition in the examinations for entry to the Royal Naval College.

ENGINEER LIEUTENANTS, AND SUB-LIEUTENANTS.

The five Acting Sub-Lieutenants who were completing their courses in England for promotion to the rank of Lieutenant, all succeeded in obtaining the necessary certificates. At the expiration of these courses, however, one was invalided, having incurred blood-poisoning, which necessitated amputation of the arm, and one resigned from the Service. The remaining three are serving in Imperial ships of the Fourth Cruiser Squadron.

Of the six Engineer Lieutenants, one deserted from the Service in England, one is at present serving in the Royal Naval College at Halifax, N.S., and the remainder are serving in ships of the British Fleet.

The reports from the Admiralty on the progress of these officers all continue to be most satisfactory.

RECRUITING.

The Government having decided not to continue H.M.C. ships *Niobe* and *Rainbow* in full commission, no recruiting was carried on during the year, and the programme of exercises and training laid down for these ships was not continued.

During the year, free discharge was given to those Canadians who entered the Service as Boys and wished to avail themselves of the offer; in addition, many of the ranks and ratings lent from the Imperial Service have completed their engagement under the Canadian Government and returned to England, without being replaced, with the result that at present the ships are only manned by sufficient crew to keep them in good order and such state that, should they be required for sea service at any time, they could be placed in full commission without undue delay.

REPORT OF HEAD SCHOOLMASTER.

The report submitted by the Head Schoolmaster, H.M.C.S. *Niobe*, is very satisfactory, and proves that the various ratings show a keen desire to increase their knowledge. The total number of attendances during a year of fifty weeks was 2,865, and total lessons given amounted to 1,167; total number of hours of attendance was 6,949, with an average attendance of nine persons.

In the month of July, evening classes were started and proved very popular with those ratings who found it impossible to attend during the day.

The Commanding Officer H.M.C.S. *Niobe* reports that great credit is due the Head Schoolmaster for his excellent work under somewhat disturbing conditions.

ESTABLISHMENT OF CHART AND CHRONOMETER DEPOT AT HALIFAX.

Under the arrangements formerly in force, there was no way of ensuring that Admiralty charts issued to the vessels of this department were corrected up to the date of issue. On leaving the publishers' hands in England a chart is correct to date, but a long time may elapse before it is issued to a ship. In consequence, serious errors may be embodied in the charts, owing to necessary corrections to lights, uncharted rocks, etc., not having been made.

To remedy this state of affairs therefore, a Chart and Chronometer Depot has been established in H.M.C. Dockyard, Halifax, N.S., under the charge of Lieutenant

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Charles White, R.N., in this office, charts intended for the use of vessels of the department will be kept properly up to date. Thus, at any time, ships' Officers will be able to compare their charts with the standard copies in the depot to so ensure that their own charts are kept up to date, and also when a ship requires a new chart, the Officer to whom it is issued will be assured that it is correct to date.

Besides the charts, chronometers, and other navigational appliances are cared for when ships are out of commission or when, for any reason, they are not required afloat.

HEALTH OF THE ROYAL CANADIAN NAVY.

A separate report by the Principal Medical Officer, H.M.C.S. *Niobe*, showing the health of the Royal Canadian Navy for the year 1913-14 is attached.

I have the honour to be, sir,

Your obedient servant,

C. E. KINGSMILL,
Vice Admiral, Director of the Naval Service.

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REPORT ON THE HEALTH OF THE ROYAL CANADIAN NAVY, 1913.

H.M.C.S. *Niobe*, at HALIFAX, N.S.,
May 14, 1914.

The Commanding Officer,
H.M.C.S. *Niobe*.

SIR,—I have the honour to submit that during the year 1st January to 31st December, 1913, 159 cases were placed on the sick list, including those of the Royal Naval College of Canada. The bulk of those cases were of a minor character, mainly consisting of colds, catarrhs, etc., mostly due to climatic conditions, and abrasions and sprains generally sustained at sports.

Sent to Hospital.—Eighteen cases were sent to hospital, one of whom died of uremia, George Cox, stoker, Royal Fleet Reserve. The remainder all returned to duty. One other death occurred in a boating accident, when William J. Harper, Master-at-Arms, Pensioner, R.N., was drowned on the night of Friday, the 21st March, 1913. Both of these deaths were duly reported to the Admiralty at the time.

Venereal Cases.—Thirty-one venereal cases were treated, gonorrhœa being responsible for the majority, few of these being syphilis. One case of cerebral syphilis, Charles Frost, P.O., was sent to hospital for treatment, and eventually returned to duty.

Fractures.—There were four cases of fractures, viz.: John W. Dunn, Ship's Corporal, fracture of tibia (right); Sidney Chick, Ord. Sig., fracture of left clavicle; Henry Coles, A.B., fracture of right great toe; Herbert H. Gould, Ldg. Sea., fracture of left tibia (extremity).

Dunn was treated in hospital, the remainder on board. All returned to duty in due time.

History of Fractures.—John W. Dunn, Ship's Corporal, fractured his right leg, the 7th March, 1913, by falling down in Water street. Treated at Military Hospital, returned to duty, and left for England shortly afterwards, time expired.

Sidney Chick, Ord. Signalman, sustained a fracture of the left clavicle, on the 16th June, by falling out of his hammock. Treated on board, was on the Sick List for twenty days, and then returned to duty.

Henry Coles, A.B., on the 20th June sustained a fracture of right great toe, by hatch falling on the same. Went to duty after treatment on board (thirty-seven days) on 28th July, 1913.

Herbert H. Gould, Ldg. Sea., on the 13th December, 1913, sustained a fracture of left tibia, malleolar region, by slipping on ice on platform, I.C.R. station. Treated on board for sixty-four days, and returned to duty on 16th February, 1914.

Contagious Diseases.—One case of measles, Godfrey Gale, Ldg. Teleg., who was sent to hospital 24th April, 1913, and was discharged to duty on 29th May, 1913.

General Health.—The general health of the ship's company, Officers and men, and of the Midshipmen and Cadets of the Royal Naval College has been excellent.

The Dockyard has been practically immune from accidents, and no serious cases have occurred there. The number of minor injuries which happened were reported to the Captain in charge.

Consultations.—1,848 consultations were given, whether on board, at the College, or at the sick quarters, during the year.

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Referring to nosological returns of *Rainbow*, there are two cases which I would mention, namely, fracture of radius, Surgeon Irwin, and syphilis tertiary, entered under the heading of syphilis secondary, John Freckelton, Sailmaker. All the other cases were of a minor character, due to climatic and the ordinary conditions prevailing.

No deaths occurred during the year.

The number of Officers and men borne on board varied from 47 to 123, making an average of 90 for the year.

The health of Officers and men has been excellent, and nothing abnormal has occurred on board.

I have the honour to be, sir,

Your obedient servant,

J. A. ROUSSEAU,
Surgeon, R.C.N.

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FISHERIES PROTECTION SERVICE.

May 6, 1914.

The Deputy Minister,
Department of Naval Service,
Ottawa, Ont.

SIR,—I have the honour to report with reference to the Fisheries Protection Service last season as to the number of vessels and men engaged, and as to where each vessel was employed, with the names of the Commanding Officers, and a brief description of each vessel.

I also append extracts from the annual reports of the various Commanding Officers, giving details of the work carried out during the season 1913-14.

Eleven vessels comprised the Fisheries Protection Service for last season, under the direct supervision of the Department of the Naval Service.

NAMES OF VESSELS AND THEIR COMMANDING OFFICERS.

Canada.—Lieutenant C. J. Stuart, R.N.R.

Curlew.—W. J. Milne.

Constance.—J. E. Morris.

Petrel.—Clement Barkhouse.

Gulnare.—C. T. Knowlton.

Vigilant.—P. C. Robinson.

Restless.—Charles Moore.

Falcon.—Alfred Copp.

Newington.—P. J. Ledwell (Fishery Officer).

Malaspina.—Holmes Newcomb.

Galiano.—Lieutenant R. M. Pope, R.N.R.

Chartered for temporary service:—

William Jolliffe.—Holmes Newcomb (Fishery Officer).

Roman.—Lieut. R. M. Pope, R.N.R.

The *Canada*, *Constance*, and *Petrel* have been exercised at mine-sweeping and general duties regarding Examination Service, as laid down in the Scheme of Defence for Halifax Harbour.

During the winter season, instruction has been given in "First Aid," in navigation and in signals to all Fishery Protection ships on Atlantic coast, and the Head Schoolmaster of *Niobe* carried on classes in the Dockyard which were well attended and proved very beneficial to the ships' companies.

No instruction has been given to officers and men of the Fishery Protection Service on the Pacific coast during the winter, as the work until the latter part of the fiscal year was carried out by chartered vessels. During the coming winter, however, courses of instruction will be given the crews of the recently commissioned ships.

The track charts for each vessel for the year are attached.

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C.G.S. "CANADA"

Is a twin-screw steel ship, whose length is 206 feet, beam 25 feet, draught 11 feet 2 inches, registered tonnage 411 tons, and speed 16 knots. She is armed with two 12-pdr. Q.F., and two 3-pdr. Hotchkiss guns, is electrically lighted throughout, and is fitted with a powerful searchlight. Her complement is 60 Officers and men all told, and she was built by Vickers, Sons & Maxim, Ltd., England, in 1904. She is commanded by Lieutenant Charles J. Stuart, R.N.R.

After a thorough overhaul during the winter, ship commissioned on April 21, and, having swung for adjustment of compasses on the 23rd, sailed for North Sydney, where she coaled. Leaving North Sydney on the 28th April, *Canada* proceeded to Magdalen Islands, calling at Bay St. Lawrence, C.B., and Meat Cove, en route. At Magdalen Islands many Canadian, United States, and French cod fishermen sheltered from a northwest gale, until the 1st May, when, the weather having cleared, ship proceeded, calling at Georgetown, Cheticamp, and Cape North, arriving at Bay St. Lawrence on 5th May, where the lobster factory was inspected.

Continued cruising, calling at Aspy Bay, North Sydney, and Cape St. Lawrence, where the cod fishermen complained of scarcity of fish. Proceeded towards Halifax and, meeting the United States mackerel seiners on 2nd June, followed them until the 8th June, when the fleet dispersed, after which ship returned to Halifax. On June 20 the Lieutenant (G) of *Niobe* tested ship's gun mountings, and on the 4th the Minister of the Naval Service and the Director of the Naval Service embarked to inspect Halifax harbour. On July 2, having the Director of the Naval Service on board, *Canada* proceeded to Chester, where the Director of the Naval Service inspected the *Petrel*, and then returned to *Canada* and visited Liverpool and Port Medway, returning to Halifax on the 7th July. On 11th July re-embarked the Director of the Naval Service and proceeded to Beaver Harbour, Whitehead, Canso, St. Peters, and, passing through Bras d'Or lakes, arrived at St. Anne harbour on 16th July.

Leaving on the 18th, ship cruised round cape North and cape St. Lawrence, and, calling at Cheticamp, proceeded to Pictou to coal ship. On the 21st proceeded, and, calling at Summerside, Gaspé, and Quebec, ship reached Montreal on the 27th July, when the Director of the Naval Service disembarked.

Leaving Montreal on the 31st July, *Canada* proceeded to Halifax, and arrived there on the 8th August, having called at Quebec, Gaspé, and North Sydney.

On the 19th August, having the First Lieutenant of the Royal Naval College on board, ship proceeded to Bettys island to render assistance to the *Diana*, the training schooner, which was ashore there. Having returned to Halifax with the Cadets, ship returned to Bettys island with party from *Niobe*, and, having salved *Diana*, towed her back to Halifax.

On 23rd August, ship visited Ingrahamport, Mahone Bay, and Shelburne, returning to Halifax on the 1st September, and on the 4th left for the eastward, calling at Liscombe, Whitehead, St. Peters, Louisburg, Sydney, Cape North, and Cheticamp, reaching Pictou on the 14th September. This port was *Canada's* headquarters until December 1, during which time ship destroyed many lobster traps, and chased the steam trawlers who were operating inside the 3-mile limit.

On the night of 1st October sighted two trawlers off cape George, and proceeded in chase of them, eventually overhauling the *Carmania*, which was boarded, but released after having been cautioned. On October 3, went to the assistance of the schooner *Jennie Epp*, which was stranded on Cole point. On 24th October went on the marine slip at Pictou, where ship's hull was inspected by the chief engineer of Halifax Dockyard. On 24th November, the main feed pipe having given out, *Canada* proceeded to Halifax under one engine, arriving on the 30th.

Ship then went into Dockyard hands for her annual refit, which was completed on the 18th March, when she left on a cruise to the westward.

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During the refit the ship's company attended classes in the Dockyard under the direction of the Head Schoolmaster of *Niobe*, which were very beneficial to the men, as were also the signal classes which were formed.

On the whole, the season for the fishermen was good, the fall mackerel catch in October on the eastern side of Prince Edward Island being exceptional; but this district, with George's bay and Chedabucto bay, was very much affected by the plague of dogfish during the summer.

During the season, up to 1st December, the ship steamed 9,961 miles.

C.G.S. "CURLEW"

Is a composite, single-screw vessel, whose length is 116 feet 3 inches, beam 19 feet 8 inches, draught 11 feet, speed $10\frac{1}{2}$ knots, and registered tonnage 157.85 tons. Her complement is 22 Officers and men all told, and she is commanded by Captain H. J. Milne.

The ship having undergone a thorough refit and overhaul during the winter in H.M.C. Dockyard, Halifax, was commissioned on the 1st April, and left on the 19th for the Bay of Fundy Station. Finding no United States boats at Johns island, proceeded to St. Mary's bay, Grand Manan, and Campobello, and kept a strict watch on the lobster fishing. On the 1st May, proceeded to the fishing grounds at Old Proprietor and continued searching for illegal lobster fishing, and on the 8th cruised to St. Mary's bay and coast of Yarmouth county, returning to Grand Manan via Digby on the 12th. On the 18th and 19th at St. John harbour prevented several boats from illegally fishing on Sunday, and during the season paid several visits to this vicinity for the same purpose.

On the 21st May, offered to assist the SS. *Gerald Turnbull*, ashore on Gannet Dry ledge, but not being required, continued cruising off Yarmouth county shore, and proceeded to Grand Manan and the New Brunswick shore on the 27th. On the 5th June, acting on information received, searched Tiverton, St. Mary's bay, Head Harbour passage, and the Bay of Fundy for the United States schooner *Actor*, but without success. On the 13th destroyed several lobster traps off Yarmouth county, and on the 17th proceeded to Quaco ledge, and continued cruising off St. John county. On the 25th visited St. John, St. Mary's bay, Tusket islands, Woods harbour, Grand Manan, and Seal islands in search of the *Actor*, destroying several lobster traps at the last-named place. On the 1st July visited Passamaquoddy bay and St. Stephen, and on the 9th arrived at Annapolis, where the Director of the Naval Service inspected the ship, which cruised to Digby and returned. Next day, on a report that United States smacks were buying spawn lobsters, cruised to Canada creek, and the head of the Bay of Fundy, Minas basin, Kingsport, and returned along the New Brunswick shore, without finding the report substantiated, and on the 17th visited Passamaquoddy bay and St. Croix river. On the 18th proceeded to Grand Manan, St. Mary's bay, Pubnico, and Seal islands, and continued in this neighbourhood till the 4th August, when ship left for Halifax, arriving on the 7th. Having carried out a test of the Examination Service, returned to Seal island, and having visited Digby, St. John, and Grand Manan, arrived at St. Andrews on the 1st September, and then returned to Seal island.

On the 10th September, after calling at St. Mary's bay, Grand Manan, Passamaquoddy bay, ship arrived at Great Salmon river where Fishery Inspector Calder made an inspection concerning a fish-way, after which ship returned to St. John, where the Lieutenant Governor of New Brunswick embarked, and went for a cruise round the harbour.

On the 19th proceeded to Grand Manan and the Bay of Fundy, and on the 26th cruised southwards to Brier island and Seal island, destroying several lobster traps en route. On the 1st October proceeded north to Charlotte county, and remained in that

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vicinity destroying illegal lobster traps and watching for illegal driving, torching, and seining of herring. On the 22nd, visited Digby and Spencers island, and returned via Isle of Haute and Quaco ledge, continuing to Yarmouth and Seal island, and cruising, on the 6th November, to Passamaquoddy bay and St. John. On the 12th November, embarked the Honourable the Ministers of the Naval Service and of Public Works, for a cruise round St. John harbour and Courtenay bay, and on the 13th continued cruising on station, visiting St. Mary's bay, Yarmouth, Tusket islands, Pubnico, Seal islands, Grand Manan, and arriving at St. John on the 8th December. On the 9th proceeded to the assistance of the schooner *Sarah V. Stetson*, off Swallow Tail, and stood by her until she was taken in tow for St. John.

Continued cruising, and on the 14th December arrived at Halifax, and went into Dockyard hands, to be fitted with extra heating apparatus, etc., for winter service, and also to undergo her annual refit.

Repairs being completed, ship left for Yarmouth on the 11th March and relieved C.G.S. *Constance*, and continued cruising the territorial waters from cape St. Mary to Seal island, with headquarters at Yarmouth, in which duty vessel was still engaged at the end of the fiscal year.

C.G.S. "CONSTANCE"

Is a single-screw composite steamer, whose length is 115 feet 6 inches, beam 19 feet 6 inches, draught 11 feet 6 inches, and registered tonnage 125 tons. Her complement is 23 Officers and men all told, and she is commanded by Captain J. E. Morris.

During the winter, ship had been laid up in winter quarters in H.M.C. Dockyard, Halifax, and underwent a thorough overhaul. On 1st April, 1913, ship was commissioned, and on 18th April proceeded to Bedford basin to swing for adjustment of compasses. Left Halifax on 19th April, anchoring at Jeddore on the 20th, after having towed the schooner *T. W. Smith* off the shoals. On 21st April cruised eastwards, calling at Canso and boarding eleven United States fishing schooners at that port; from April 23 to June 3 continued cruising in vicinity of St. George's bay and cape North, and on 5th June followed the seiners from Canso to North Sydney, boarding twenty seiners at Louisburg on the 6th. Continued cruising off cape North, St. George's bay and Northumberland straits until 20th July, when the Director of the Naval Service inspected ship at Pictou, after which ship proceeded through Lennox Passage, and took C.G.S. *Gulnare* in tow for Halifax, arriving there, after experiencing dense fog, on 24th July. On July 30 left Halifax and cruised towards the eastward. Returned to Halifax on August 5, and, in company with *Petrel*, carried out mine-sweeping in Bedford basin, completing this on August 13. Ship sailed on August 14, calling at Guysborough and Canso, for the Regattas, and then cruised in St. George's bay and Northumberland straits until 31st August, returning to Halifax again on the 2nd September. On 3rd September proceeded to the westward, calling at Liverpool, Lockport, and Shelburne, where Mr. Fisher, Fisheries Officer, embarked to settle disputes at Green harbour and Seal island. Returned to Shelburne on 15th September, and then cruised eastwards, calling at Liverpool, and arriving at Halifax on October 5. Attended Shelburne exhibition on October 15 and then returned to Halifax, having called at Liverpool, and arriving on the 19th October.

Ship then continued cruising to the eastward, in the vicinity of St. George's bay and Prince Edward Island, until 13th November, when she returned to Halifax, and underwent certain repairs to fit her for winter service. These being completed, on the 25th November *Constance* continued cruising in St. George's bay and Northumberland straits, returning to Halifax on December 15. Left Halifax on December 17, calling at Liverpool, Shelburne, and Yarmouth, and cruising on station, between cape Sable and Brier island and St. Mary's bay until 14th January when, the R.M.S. *Cobequid* being reported ashore on Trinity ledges, *Constance* proceeded to her assistance but, owing to stress of weather, was forced to return to port. On January 15 proceeded to

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the wreck, but arrived too late to be of assistance. Continued cruising on station until February 6, when ship proceeded to Yarmouth and was fast in the ice there until March 3. Left Yarmouth March 13, passed through Schooner passage, and, having received orders to return to Halifax, proceeded thither, calling at Shelburne and Lunenburg, and arriving at Halifax on 20th March, when ship went into Dockyard hands.

During the year, *Constance* steamed 8,444 miles, and boarded 100 foreign fishing vessels.

C.G.S. "PETREL"

Is a steel, single-screw ship, whose length is 116 feet, beam 22 feet, draught 9 feet, speed 11 knots, and registered tonnage 191 tons. Her complement is twenty-four Officers and men all told, and she is commanded by Captain Clement Barkhouse.

The ship, having wintered at Shelburne, was commissioned at that place on 1st April, 1913, and on the 10th was towed to Halifax by the C.G.S. *Gulnare*, for boiler drill-testing and completion of repairs. On 19th May, repairs being finished, ship swung for adjustment of compasses in Bedford basin, and then proceeded west to her station. Calling at Lunenburg and Liverpool, ship met the mackerel fleet off Lockeport on the 20th May, and cruised east with them. On the 22nd, owing to a southeast gale, fleet sheltered in Prospect, proceeding on the following day. By the 25th the mackerel fleet numbered thirty-three ships, and on that day the first catch was made, the fish being very plentiful. Continued cruising with the fleet, calling at Chester, Green island, Sambro, and Halifax. On the 3rd May cruised eastwards again, calling at Isaac harbour, Whitehead, Canso, Arichat, and Louisburg.

On the 5th June *Canada* relieved *Petrel* on that station, and Mr. Woods was embarked to give instruction in signals, and ship proceeded to North Sydney. On 7th June left North Sydney and, passing through the Bras d'Or lakes, arrived at Canso on the 9th. On 10th June proceeded to render assistance to the schooner *Shamrock* of Lunenburg which was ashore on White point, but found the vessel unsalvageable. Cruised westwards, calling at Isaac Harbour, Country Harbour, Sonora, and arrived at Halifax on the 12th June, where Mr. Woods was discharged. Continued cruising on station from Halifax to Seal island until July 3, when the Director of the Naval Service embarked, and visited Lunenburg and La Have river, returning to Chester, where the Director of the Naval Service disembarked. On the 4th, took Fishery Overseer F. O. Evans to Northwest and Southwest coves to settle disputes, and on the 5th took Fishery Overseer F. O. Hebb to settle a trap-net dispute at Cross island. Continued cruising on station, and on the 11th boarded and seized the United States fishing schooner *Rec* in Liverpool bay, and handed her over to the Collector of Customs at Liverpool. On the 18th July, took Mr. F. O. Evans to settle a dispute at Southwest island, St. Margaret's bay, and on the 23rd, Mr. Ward Fisher, Inspector of Fisheries, embarked. Visited Gold river, Martins river, Mushmush river, Mahone bay, La Have river, and Petite river, and Mr. Fisher left ship on 30th July.

Cruising was then continued on station till 6th August, when *Petrel* returned to Halifax for mine-sweeping practice, which lasted until the 15th, in company with C.G.S. *Constance*. On the 19th visited Port Clyde, and on the 22nd proceeded to Chester to render assistance against the forest fires, continuing cruising on the following day. On the 27th August, ship arrived at Halifax, and went into Dockyard hands until 10th October, when repairs were completed.

On the 11th proceeded to cruise on station, and on the 14th met the first of the United States fall mackerel seiners. Proceeded to Seal island with the Inspector of fisheries, who left ship at Barrington passage, and with Mr. Fraser, Fisheries Overseer, on board, proceeded to Monton island in search of illegal lobster fishing.

Petrel continued cruising with the seiners until the 15th November, when the last of them left the coast, and on the 24th arrived at Halifax and went into Dockyard

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hands, to be fitted with extra heating apparatus for winter service. On 5th December left Halifax and cruised west until the 12th when she returned to Halifax, where the Director of the Naval Service inspected ship.

Having taken up station on the western division, with Shelburne for headquarters, on the 22nd ship went to sea in search of a motor fishing boat which, with two men on board, was lost, and succeeded in finding boat and turned her over to the Collector of Customs at Shelburne.

On the 20th January went to the assistance of the Lockeport schooner *Lizzie A*, which was ashore, and, having pulled her off, towed her to a safe anchorage. On the 16th February towed the United States fishing schooner *Frances P. Mosquita*, which was fast in the ice in Shelburne bay, clear of ice. On the 18th proceeded to search for the missing Lockeport schooner *Dolly Gray*, but without success. On the 19th, found the Lockeport schooner *Olive R.* ashore at Negro harbour, and towed her to a safe place. On the 7th March towed the new Shelburne schooner *Cecil L. Shane* to safe anchorage, clear of ice, and on the 20th, having been relieved by *Canada* proceeded to Halifax, to go into Dockyard hands and give leave.

The catch of the United States mackerel seiners in the spring was fair, and in the fall was a failure. The coast mackerel catch in the fall at St. Margaret's bay, Liverpool, and Shelburne was the best for the past twenty years. The United States lobster fishermen made good catches, as did also the Canadians, and very little illegal lobster fishing was found.

During the year *Petrel* had 106 United States fishing vessels on her station, the total number of boardings being 223. Ship was at sea 734 hours, and steamed 6,135 miles.

C.G.S. "GULNARE"

Is a steel, single-screw vessel, whose length is 137 feet, beam 20 feet 5 inches, draught 12 feet, registered tonnage 262 tons. Her complement is twenty-five Officers and men all told, and she is commanded by Captain C. T. Knowlton.

During the winter *Gulnare* underwent a thorough overhaul and refit, in H.M.C. Dockyard, Halifax, and on the 1st April was commissioned. On the 9th, after swinging for adjustment of compasses, ship left for Shelburne, and on arrival took C.G.S. *Petrel* in tow for Halifax, arriving on the 10th. On the 15th, with Lieutenant White on board, proceeded to Chebucto Head, returning again that evening. On the 21st, after having coaled, ship left for the westward, and calling at Lunenburg, Port Mouton and Shelburne met the United States fishing fleet, and continued cruising between Shelburne and Pubnico, as necessary until the 22nd May, when ship returned to Halifax. Here, owing to a small outbreak of diphtheria, *Gulnare* was kept in the stream until the 4th June, after which vessel left for Louisburg, Flint island, and North Sydney, where ship arrived on the 8th. Here various engine-room repairs were carried out, and ship continued to cruise towards Pictou, Port Hood, Cheticamp, and North Sydney, returning thence to Pictou and Georgetown.

Continued cruising on that station until the 15th July, when the Director of the Naval Service embarked at St. Peters inlet to inspect the ship, leaving her afterwards at Grand Narrows bridge, the ship proceeding to St. Ann's in company with *Canada*.

Proceeded to sea on the 18th and, owing to a breakdown in the engine room at St. Peters, C.G.S. *Constance* towed *Gulnare* to Halifax, arriving on the 23rd July.

From that date ship was in Dockyard hands undergoing repairs and refitting. The ship's boiler, having been found to be worn out, was condemned and a new one was supplied by Messrs. The John Inglis Co. of Toronto, and fitted in the ship by Dockyard labour.

C.G.S. "VIGILANT"

Is a twin-screw steel ship, whose length is 177 feet, beam 22 feet, draught 9 feet 6 inches, registered tonnage 242 tons, and speed 16 knots. She is electrically lighted

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throughout, and fitted with a powerful searchlight. Her complement is thirty Officers and men, all told, and she is commanded by Captain P. C. Robinson.

Having been given a thorough refit at Port Dover during the winter months, the *Vigilant* commissioned on the 1st April, 1913, and until 12th hands were employed in getting her ready for sea. On the 12th left for the westward, calling at Port Burwell (on account of bad weather) and Port Stanley (for coal). Whilst off Point Pelee, on the 15th April, seized some United States nets, which were taken to Kingsville and sold. Cruising was carried on without incident until the 28th May, when more nets were seized in the western portion of the lake, and were also sold at Kingsville, and again on the 26th June, when more nets were seized and sold at Port Dover. On 11th July a further quantity of nets were seized, taken to Kingsville and sold. On 20th July proceeded to Collingwood, where various repairs to boilers were made, and a separate circuit for signal lights installed.

Repairs having been completed, ship left on the 12th August, arrived at Port Dover on the 14th, coaled ship, and resumed work on the line until the 31st August, when United States nets were seized off Long point and landed at Port Dover. More nets were seized on September 6, 11, 14, 23 and 25 off Long point, and were taken to Port Dover and sold. Returning to Port Dover on 31st September, embarked the Director of the Naval Service, and proceeded to Port Colborne, returning to Port Dover the next day, when the Director of the Naval Service left the ship.

Continued cruising on the line, and seized nets on the 10th, 12th, and 14th October off Long point. On the 22nd October conveyed the crew of the wrecked steamer *C. W. Elphicke* from Long point to Port Dover; this was an American vessel loaded with wheat from Fort William, which was caught in a gale and driven on shore.

During the end of October and all through November the weather was stormy and unfit for work on the line, and very few fishermen were sighted. On the 21st November, seized nets off Pelee island, and took them to Port Dover. Next day proceeded to search for a wreck off Rondeau, but found nothing. Was delayed at Rondeau by heavy weather, but left on the 25th November and cruised westward, later going to Middle Sister island to investigate reported poaching, but finding nothing.

Arrived at Port Dover on the 4th and Port Colbourne on the 5th, where the Director of the Naval Service inspected ship, leaving the same day. On 17th December proceeded to Port Maitland to investigate reported poaching, and on the 18th Engineer Commander Howe embarked, and left the ship at Port Dover in the evening.

On the 21st ship received orders to lay up, and on the 26th *Vigilant* was paid off and went into winter quarters at Port Dover.

The season was, on the whole, good for the fishermen, and, with the exception of the determined attempt off Long point, very little poaching was found in other portions of the lake.

During the season C.G.S. *Vigilant* steamed 7,465 miles, and seized 987 nets.

C.G.S. "RESTLESS"

Captain Charles Moore, was, at the beginning of April, 1913, engaged on patrol duty on the northern coast of British Columbia, where she remained until the 30th, when she proceeded to Prince Rupert, and was inspected by the Director of the Naval Service. Left for Esquimalt on May 1, and arriving on the 5th went into Dockyard hands, and was given a thorough overhaul.

This being completed on June 11, ship left for the west coast, and carried out patrol duty there until the end of the month, when she returned to Esquimalt. During the month of June no foreign fishermen were operating in the straits of Juan de Fuca, as the salmon were late in coming in.

On the 5th July, ship reported to Mr. F. A. Cunningham, Chief Inspector of Fisheries, at New Westminster, and then proceeded to Alert bay, and embarked

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Fishery Officer Lucas to visit the fishing stations in his district, afterwards returning to Esquimalt via Union bay and Nanaimo.

Left Esquimalt on the 26th for duty on the west coast, with headquarters at Alberni, and until October 1 was engaged in taking Fishery Officers Woods and Grice over their districts, and in patrolling the salmon banks. During this season no United States fishing boats were met with in or near territorial waters. On October 3 ship arrived at Esquimalt and, having been prepared for winter service, left again on the 29th for patrol duty in the vicinity of Bull harbour, which was carried out until December 1, when *Restless* proceeded to Prince Rupert, calling at Union en route, and being delayed several days by gales, arriving there on the 20th December.

For the remainder of the fiscal year, ship was on patrol duty in the vicinity of Dundas, Stephens, and Banks island under orders of Captain Holmes Newcomb of the *Malaspina*.

On the whole, the fishing industry on the west coast during 1913 was disappointing, owing to the light run of sockeye salmon and the belated arrival of the fall fish. Very few fishing-boats were operating in Hecate straits and Dixon's entrance, and no United States fishermen were met with, as they all, both Canadian and foreign, were fishing further west along the Alaskan coast.

During the year *Restless* steamed 7,243 miles, and was underway 796½ hours.

C.G.S. "FALCON"

Captain Alfred O. Copp, at the opening of the fiscal year, was at Prince Rupert, which place she left on the 2nd for Esquimalt, arriving on the 11th. Here the ship was given a thorough overhaul in H.M.C. Dockyard, which was completed on the 10th May, when ship left for Vancouver. Left Vancouver on the 19th May with Inspector J. T. C. Williams on board, for Port Essington, arriving there on the 31st May, having called at Union bay, Brunswick cannery, Rivers inlet, and several canneries.

From June to October, *Falcon* patrolled Skeena River district with Inspector Williams, and on the 22nd October left for Vancouver, arriving on the 27th, and then going to Esquimalt, where ship was surveyed and then paid off.

During the months of May to October, *Falcon* steamed 5,767 miles and made 245 calls.

C.G.S. "NEWINGTON,"

Fisheries Officer P. J. Ledwell, was, at the opening of the fiscal year, cruising in Hecate straits, where she remained until the 15th April, returning to Victoria on that date for overhaul.

Left Victoria on the 24th April, returning to Hecate straits, and cruising in that vicinity until the 15th May, when ship returned to Victoria for a slight overhaul. Left Victoria again on the 21st May, continued cruising on west coast and Hecate straits till 26th June, when *Newington* arrived at Victoria, remaining there until July 2, when she left again, and continued cruising until July 30. Left Victoria on August 8 and continued on station. On August 24 towed Japanese barque from Casey bay to Prince Rupert, and on September 5 arrived at Esquimalt. Left for station again on September 12, and cruised until October 10, when ship returned to Victoria, leaving again on October 23. Continued on station until November 21 when Victoria was reached, and on 27th left for station again, where ship remained until December 23, when she returned to Victoria.

Left for station on January 2, and remained there until March 5, when ship arrived at Victoria, where she was at the close of the fiscal year.

During the year *Newington* steamed 17,412 miles and was at sea 1,967 hours.

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C.G.S. "MALASPINA"

Is a steel single-screw vessel, whose length is 160 feet, beam 26½ feet, draught 12½ feet, speed 14½ knots, and displacement 700 tons.

She is electrically-lighted throughout, fitted with a powerful searchlight, and is armed with one 6-pdr. Q.F. gun. Her complement is thirty-three Officers and men all told, and she is commanded by Captain Holmes Newcomb.

This vessel, which was built by the Dublin Dockyards Company, Dublin, Ireland, arrived at Vancouver on 21st November, 1913, and after undergoing a slight overhaul, consequent on her passage out from Dublin, was formally commissioned early in January, 1914.

Ship left Esquimalt on 4th January, and continued to cruise in Dixon entrance, Hecate strait and west coast of Queen Charlotte islands until the end of February when she returned to Esquimalt, leaving there again on the 13th for northern waters, where she was cruising at the end of the fiscal year.

C.G.S. "GALIANO"

Is a steel, single-screw vessel, whose length is 160 feet, beam 26½ feet, draught 12½ feet, speed 14½ knots, and displacement 700 tons. She is electrically-lighted throughout, fitted with a powerful searchlight and is armed with one 6-pdr. Q.F. gun. Her complement is thirty-three Officers and men all told.

This vessel was built by the Dublin Dockyards Company, Dublin, Ireland, and arrived at Esquimalt on the 27th February, 1914. She then went into Dockyard hands for a few repairs and alterations, consequent on her voyage out from Dublin, where she remained until the close of the fiscal year.

On the 24th March, Lieutenant R. M. Pope, R.N.R., assumed command of this ship.

SS. "WILLIAM JOLIFFE"

Having been chartered as a Fisheries Protection Vessel from the British Columbia Salvage Company, with Captain Holmes Newcomb as Fisheries Officer, was, at the opening of the fiscal year, cruising in Hecate straits and Dixon entrance, where she continued until May, when the west coast of Vancouver island was visited. On the 11th seized the United States schooner *Valiant* near Haycock island, and towed her to New Westminster. Ship then cruised west coast of Queen Charlotte islands for the remainder of the month, returning in June to the coast of Vancouver island and Hecate straits. In July, ship continued cruising on west coast of Queen Charlotte islands, and in August proceeded to Hecate straits and Dixon entrance. Here, on the 16th August, the Japanese barque *Kinkasin Maru* was seized, and having been towed to Prince Rupert was turned over to the Collector of Customs at that port, after which, until the end of the month, cruising was carried on off the west coast.

At the end of August, owing to the expiration of the charter, etc., *William Joliffe* was returned to the owners, and Captain Newcomb joined the chartered vessel

"ROMAN"

as Fisheries Officer, which had been chartered from the British Columbia Packers' Association. This vessel continued cruising off Queen Charlotte islands, Vancouver island, and the west coast, watching the harbours and keeping foreign fishermen outside the 3-mile limit, until the end of December, when, on the commissioning of the C.G.S. *Malaspina*, Captain Newcomb was relieved by Lieutenant R. M. Pope, R.N.R., as Fisheries Officer, who continued in this position until the 24th January, when the charter expired, and Lieutenant Pope proceeded to join C.G.S. *Malaspina*.

I have the honour to be, sir,

Your obedient servant,

C. E. KINGSMILL,

Vice Admiral, Director of the Naval Service.

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REPORT OF THE SURVEY OF TIDES AND CURRENTS.

OTTAWA, April 1, 1914.

The Deputy Minister,
Department of the Naval Service,
Ottawa.

SIR,—I have the honour to submit the following report regarding the Survey of Tides and Currents during the twelve months ending March 31, 1914.

The regular work of this Survey in maintaining the tidal stations and publishing Tide Tables and other information, has been carried on without interruption; and a considerable amount of new work has been done in securing further observations, and in reducing these to practical shape. The new work has consisted chiefly in further tidal observations on the coast of New Brunswick, and the investigation of the currents in the passes of British Columbia; and also the successful outcome of the investigation of the tides in Hudson bay and strait.

TIDAL OBSERVATIONS.

The principal tidal stations have been maintained in continuous operation throughout the year, and no serious damage has resulted from winter storms. The chief improvement has been in arranging for more accurate time at some of them. There are six of these stations in Eastern Canada, and five on the Pacific coast, as well as two others which have been discontinued because sufficient tidal data have already been obtained from them. The reduction of the tidal record from these stations affords an improved basis for the calculation of the Tide Tables, and enhances their accuracy from year to year.

In making these reductions, it is necessary to maintain a truly uniform datum from which the height of the tide is measured. A basis for this is established by means of instrumental levels at these stations. The height of the tide is then measured hour by hour throughout the year, from the record obtained from the registering instruments, with due allowance for time errors from day to day. If any interruption occurs, it must be made good. During the year the record from the principal stations thus reduced amounts to five years from the stations in Eastern Canada and two years from the stations on the Pacific coast. This reduction, when submitted to harmonic analysis, affords the improved data desired.

Two new tidal stations were erected in British Columbia; one at Cowichan bay in the region of the Gulf islands of the strait of Georgia, and the other at Nass bay in one of the northern inlets north of Port Simpson. The location of these stations was so chosen that comparisons with the principal stations afforded tidal differences for several other harbours in their vicinity.

In Eastern Canada, new tidal stations were established in Chaleur bay and at Chatham, in Miramichi bay. The object in view in establishing the stations in the outer part of Chaleur bay, was to ascertain whether this area could best be referred to Father Point or to St. Paul island. The result has shown that the whole bay may be referred with best advantage to Father Point, as this had already been found true of the head of the bay. From a tidal point of view, the bay is thus a duplicate of the St. Lawrence estuary. The outcome is to afford reliable tidal data for three harbours on the north shore of the bay, and for Caraquet on the south shore. This work was in charge of Mr. H. W. Jones, who also inspected the outlying tidal stations in the area

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of the Gulf of St. Lawrence. It is proposed in the coming season to continue these investigations farther southward on the east coast of New Brunswick, as it is important to do so while the tidal station at St. Paul island continues in good working order for reference. The extreme exposure there, has always made this station a difficult one to maintain.

In addition to the tidal observations thus obtained directly by this Survey, a considerable amount of information was secured through co-operation with others. Observations were secured on the St. John river at Gagetown, Oromocto, and Fredericton, which is practically the head of tide water. Registering gauges were supplied to Mr. J. K. Scammell of the Public Works department, who supervised the work, with the object of obtaining information on the relative levels of the river for his own purposes. On the lower St. Lawrence, tidal record was obtained by the Hydrographic Survey at Jeremy islets, a locality adjoining Bersimis, which fills a long gap on the north shore of the St. Lawrence estuary. On the Pacific coast, additional observations were obtained at Pacofi, and at Queen Charlotte in Skidegate inlet, by Captain Musgrave, of the Hydrographic Survey. The information thus obtained is indirectly useful for the purposes of this Survey; and it is obtained with a minimum of expense.

CO-OPERATION WITH OTHER SURVEYS.

The amount of co-operation with other Surveys which has been carried on during the year will be evident when it is stated that ten registering tide gauges have been supplied, together with complete outfits, and instructions for taking the tidal observations. In addition to the three gauges supplied to the Hydrographic Survey and the three for the St. John river, four were supplied for use in Hudson bay. These gauges, with the necessary outfits, were furnished to other surveys and to railway parties. They were for use at Nelson in Hudson bay, and at Moose factory and Charlton island in James bay. The observations will be of much value, as they are from comparatively new localities for which further information is needed.

INVESTIGATION OF THE CURRENTS.

The most important work under this heading has been the observation of the current in the northern passes of British Columbia, notably at Seymour Narrows. The object was to obtain an improved basis for the calculation of slack water in those narrows, which will be invaluable for the large coast traffic of British Columbia, as well as for the international traffic to Alaska. The observations in Seymour Narrows, as indicated in the last report, were begun in February and continued for nine months until the end of November. Simultaneous observations during seven months were obtained at the Yuculta rapids, as these are the two extreme passes next Vancouver island and next the mainland, in the whole complex of passages in that region. Another pass, named Hole-in-the-Wall, in the middle of this network of passages, is of much importance, as its central position brings it into closer relation with the time of the tide at the port of reference; and also the turn of the current is very sharp and definite. This pass has thus a high strategic importance, and arrangements were made with a resident in Wyatt bay to obtain observations in it. These observations in the various passes were supervised by Mr. S. C. Hayden.

Simultaneous observations at three passes were thus secured; and at two of them houses had to be built for the observers, as the shores are uninhabited, and there is no means of obtaining the correct time except by the use of chronometers. From these excellent observations, and their prompt reduction, improved values have been obtained for the calculation of the time of slack water in the whole series of passes in this region, in the Tide Tables for 1915.

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These new observations afford a distinctly better value for the calculation of tables of slack water for Seymour Narrows in future. The point of observation is also better than before, as it was selected after an examination of both shores, made personally by the superintendent. The reduction of the observations is necessarily difficult, chiefly because the tide is of two different types, north and south of the Narrows: and also because the night tides are missing, which leaves the large diurnal inequality to be determined indirectly. The large tides at both high and low water are the most definite, however, and it is at these that the time of slack water is of most importance to navigators, as at the half tides the current has not, by any means, such strength. The method already adopted and explained in the Tide Tables is still the best that can be devised to meet these difficulties.

HUDSON BAY AND STRAIT.

In Hudson strait, extended observations were obtained at Ashe inlet, which is just in the middle of the strait at a most suitable point for a tidal station. When the observations were examined in detail, however, they proved to be much broken, and thus unsuitable for reduction by harmonic analysis, as a basis for tide tables. The further investigations referred to in the last report have proved eminently successful, however, as they resulted in showing that Ashe inlet could be referred with advantage to St. John, N.B. For the tide in Hudson strait proves similar to the Bay of Fundy, as they both show the dominating influence of the moon's distance upon the tide. The range is also much the same at both places, as it is over 30 feet at the springs at Ashe inlet.

To obtain the best comparisons with St. John, N.B., the tides were recalculated for the back years 1884, 1885, and 1886. Such calculation for the past can be made as readily by means of harmonic analysis as for the next year ahead; and for St. John, N.B., the basis of this analysis now extends over fifteen complete years, which makes the tide tables so calculated to be quite accurate. The tidal differences between Ashe inlet and St. John which result, are remarkably constant, and will afford satisfactory values for computing the tide in Hudson strait, whenever it may be desirable to do so. The problem of the tide in this strait may therefore be considered as solved. By the discovery of this method, the expense will be saved of establishing a thoroughly equipped station in Hudson strait, which would otherwise be necessary.

The observations at other points in this strait from Port Burwell to DeBoucherville will enable the run of the tide throughout the strait to be ascertained; although the observations are much broken and not always simultaneous, and much care will be required in their reduction.

For the calculation of Tide Tables for Nelson, the method indicated in the last report has proved quite satisfactory, when followed out in detail. The time of high water is calculated by a direct difference from Bremerhaven; but as in most European ports the time of low water is wanting, it was found better to compute this from the duration of the fall of the tide. This duration varies throughout the course of the lunar month, but the law of variation was ascertained. The calculation of the rise of the tide was a matter of much greater difficulty, as the observations available were for short periods, and they happened to be of the same type from an astronomical standpoint. Without entering into details which would be highly technical, it will be sufficient to say that a satisfactory method has been arrived at, by which the height of the tide can be calculated in terms of two series of variables. This method was utilized immediately to fill in a gap of twenty-two days in the tidal observations of last season, and thus to enable the soundings during that period to be reduced for chart purposes. The problem of Tide Tables for Nelson, which will at least be fairly close to the truth, may therefore be considered as solved, although further observations are desirable to improve the accuracy of the values used in the calculations. Tide

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Tables were issued in manuscript for the season of 1913; and for the coming season of 1914, tables are printed giving the time of high and low water for Nelson, and also a difference which will enable the time of the tide at Moose Factory in James bay to be known. For the season following it is hoped to prepare tables giving both the time and height.

The tide at Churchill has also been successfully dealt with. It was found after considerable research, through following up the clue already explained with regard to the similarity of the tide in Hudson bay and the North sea, that the tide at Churchill can be calculated directly from Harwich, England, by means of a constant difference for both high water and low water. The tides at the two places are remarkably similar; as in both, the fall of the tide is of shorter duration than the rise, which is quite an unusual feature. There are other places on the open coast of Hudson bay, and at the mouth of James bay which can probably be referred to Churchill with good results.

These investigations which are based on all the information so far available, serve also to indicate methods by which the tides throughout Hudson bay can be dealt with in future in a satisfactory manner.

INFORMATION SUPPLIED.

An unusual amount of work has been done during the year, at the request of other departments, or for outside engineers. The greater part of this had to do with the levels deduced from the tidal observations. The material for any information of this character is contained in the tidal records, and can be worked out specially to meet requirements as they come up. The following may be mentioned as examples of such information:—

The true average level of high water at Victoria, B.C., was desired by a committee of Engineers, to establish definitely the shore boundary of water-front properties. The question of importance was the method by which this level should properly be determined, owing to the unusual character of the tide at Victoria. It was decided to adopt the average elevation of the higher of the two high waters in each day, as deduced from a period of two complete years. The average is thus based upon the level of 730 individual tides; and the resulting elevation is referred to two permanent bench-marks in Victoria. The frontage of shore properties will thus be definitely fixed for the future for the district extending from Esquimalt to Oak bay.

On the request of the Hydrographer of the British Navy, concise notes on the behaviour of the current at the entrance to the St. Lawrence were prepared in a special manner for insertion in three charts of that region. It was a matter of considerable difficulty to reduce the information regarding the variations of the Gaspé current to so concise a form, without making it so definite as to be misleading, or making a statement so vague as to be useless to the navigator. The features of such a current are quite different from the characteristics of definite tidal streams, which it is not difficult to bring into the form of a table.

The question of the true value of Mean Sea level as a basis for the intended levelling operations which are being carried out by the Public Works department and the Dominion Observatory has been under discussion. It was found that, as matters stood, there were two differing datum planes for reference in these levels which had been carried across three provinces, neither of which corresponded with the accurate value of mean sea level, as determined by this Survey. These determinations are derived in this region from a series of years of tidal observation at Halifax and Father Point; and they thus afford two starting points for accurate levelling at the ends of a base 500 miles in length, which extends across three provinces from Nova Scotia to the St. Lawrence. From this line as a basis, levels can be carried westward

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parallel with the direction of the St. Lawrence, to connect with the levels of the Great Lakes, which are well established.

A special report was prepared for the Public Works department explaining in detail the data for these accurate determinations of mean sea level at Halifax and Father Point. This was accompanied by a diagram showing the correlation of mean sea level at Halifax and New York, with respect to the slight variations which occur from year to year, in their relation to the average level.

The value of mean sea level at Vancouver was also supplied to the secretary of the Commission of Conservation. Any such value as determined by this Survey has a high accuracy, as it is based on the height of the tide hour by hour, day and night, for a period of a complete year at a time. In this instance, the value for Vancouver is deduced from six years of this character.

The levels of extreme tides at Halifax were supplied to the Superintending Engineer of Government railways there, for reference in deciding upon the best elevation above high water for the extensive harbour works now in progress. These levels are obtained from the tidal record at Halifax, extending back to more than ten years ago.

Some assistance has been given to the Hydrographic Survey on the Lower St. Lawrence and on the Pacific coast in determining the best low-water datum for their purpose, in relation to the tidal observations. It is always desirable to make the datum for the chart soundings the same as that from which the height of the tide is measured; so that the two together may represent the available draught which the navigator can count upon.

A description of the bench-marks established by the Tidal Survey in southern Nova Scotia was supplied to a party from the Dominion Observatory, now engaged in carrying levels along the Atlantic coast of Nova Scotia, from Halifax to Yarmouth.

Considerable exchange of information has been made with the Engineers of the Public Works department in the way of tidal observations and other related matters. The low-water datum used for dredging may be advantageously utilized for tidal observations, and tide levels may often be supplied by this Survey which are of service to them.

These examples may illustrate the service which this Survey is able to render to other departments in addition to its direct advantage to navigation.

PUBLICATIONS.

A publication on the currents was issued during the year entitled "Currents in the Gulf of St. Lawrence." This is largely a reprint of the former report with the same title, brought up to date. It contains, in addition, new information regarding the Gaspé current and Northumberland strait, as well as a brief summary for Belle Isle strait. It is thus fairly complete for the whole Gulf area. The information for Northumberland strait is published for the first time, and is fully given. It brings the currents in the three narrows of the strait into relation with the time of the tide, which enables the mariner to know whether flood or ebb is running at the time, and also the approximate strength of the current at its maximum. A concise summary of these results has also been prepared for publication in the Tide Tables, as well as a similar summary regarding the Gaspé current and the Anticosti region. In these summaries the more ordinary points are indicated for the use of mariners, and references are given to the reports in which fuller details may be obtained.

The tidal information for Canada is published in two sets of Tide Tables; one for the Eastern coasts and the other for the Pacific coast, their distribution being thus facilitated. The editions of these tables now reach a total of 14,000, and a large proportion are sent out individually, as they are mailed free on request to all applicants.

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In addition to the complete tables, two abridged editions are issued of pocket size. One of these is for Quebec and the St. Lawrence, and the other for St. John, N.B., and the Bay of Fundy. These abridged editions are much appreciated and their total circulation now amounts to 12,000.

The Tide Tables for the more important harbours in Eastern Canada and on the Pacific coast, eight in all, are now republished by the British Admiralty. Tidal information for the St. Lawrence is also furnished to the Department of Marine and Fisheries for their publication on the St. Lawrence Ship Channel, for the use of pilots. Two leading Almanacs in Canada include Tide Tables for some of the more important harbours, for which acknowledgment is made to this Survey. In these various ways the information attains a very wide circulation, and should reach all who require it. It is interesting to find that many manufacturing establishments and other industries on the coast have constant use for Tide Tables, in addition to the shipping interests.

STAFF.

The staff of this Survey for the office and field work comprises only four, in addition to the superintendent, together with the outside tidal observers, who number six in Eastern Canada and five on the Pacific coast, at the permanent stations. In addition to these, several others are usually employed locally in the summer season, in the observations of tides or currents; and there are engineers on other Surveys who give their co-operation. The permanent assistants supervise the outside work in the summer season, including the inspection and repairs of the tidal stations; and they carry on in the winter the reduction of the observations and the calculation of Tide Tables, as well as the ordinary office work.

I have the honour to be, sir,

Your obedient servant,

W. BELL DAWSON,
Superintendent of Tidal Surveys.

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HYDROGRAPHIC SURVEY.

OTTAWA, July 17, 1914.

The Deputy Minister,
Department of Naval Service,
Ottawa.

SIR,—I have the honour to submit a report upon the work of the Hydrographic Survey during the fiscal year 1913-14.

The following parties were in the field during the summer of 1913:—

First.—Hudson Bay party, working off Port Nelson.

Second.—Lower St. Lawrence River party, working below Father Point and off both north and south shores.

Third.—Lake Ontario party, working in the northwest end of the lake.

Fourth.—Lake Superior party, working in the vicinity of Jackfish bay and Slate islands.

Fifth.—Pacific Coast party, working in Hecate strait and off the east coast of Queen Charlotte islands.

Sixth.—A party looking after the automatic gauges in the Great Lakes and St. Lawrence river.

In the early part of July the steamer *Acadia*, built by Swan Hunter and Wigham Richardson, of Newcastle-on-Tyne, arrived in Halifax, crossing the Atlantic under her own steam. After an inspection she was considered in fit condition to proceed upon her work, and was provisioned for service in Hudson bay. She is a steel schooner-rigged, single-screw vessel, 170 feet long, 33½ feet beam and 21 feet depth.

On account of the service she was to be employed in, she is a radical departure from the style of the other surveying steamers of our service in that the sides are extended to the upper deck to give more and better accommodation on the main deck, and make her more comfortable in heavy weather. All the Survey vessels are twin-screw, but for this service it was deemed wiser to use a single screw.

Because she was expected to encounter ice the stem and plates likely to be exposed are double thickness, and the framing is not only heavier but the widths of the spaces between have been reduced and, in addition, extra fore and aft angles were supplied. In spite of these precautions the plates were very seriously indented in the fore part, and additional strengthening angles have been put in.

As this vessel is far heavier and stronger (probably twice as strong) than the ordinary vessel built to Lloyds' requirements, it proves that merchant vessels will incur serious risks in navigating the straits and bay unless strengthening is resorted to.

She is equipped with the most modern wireless outfit and, on account of the sluggishness of the compass needle in Hudson bay, due to the close proximity of the North Magnetic pole, all the metal within 15 feet of the compass is sceptre bronze, to reduce as much as possible local attraction and weakening of the directive force.

Her coal bunkers have been made extra large, and everything possible done to keep the consumption of fuel to a minimum.

I am pleased to be able to report that the vessel is a success and is economical in fuel consumption, a very important consideration in such long cruises.

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In October the schooner *Naden*, built by the Wallace Shipbuilding Company, of Vancouver, B.C., was delivered to the Survey at Esquimalt. She is equipped for the present for sailing only, although provision is made for the installation of a gasoline engine. She is 98½ feet in length, 20 feet beam, and 9 feet in depth, and is to be used for the accommodation of a party surveying in sheltered waters, releasing the more expensive steamer and party for service in exposed waters.

The fleet of the Hydrographic Survey is now composed of the steamers *Acadia*, *Cartier*, *Lillooet*, *Bayfield*, *La Canadienne*, and schooner *Naden*; all in first-class condition and well equipped for the service.

HUDSON BAY PARTY.

A report in detail, by Mr. F. Anderson, of the work and cruise of this party is annexed. (Appendix I.)

It had been intended to despatch this party to the bay on 1st July in the steamer *Minto*, but the outfitting proved a larger task than had been anticipated and she was not ready when the *Acadia* arrived in Halifax from England. The latter vessel was therefore ordered north and was ready for sea on the 24th July, but the steamer *Beothic* which had been chartered to carry coal supplies and launches north, and had sailed a few days previously, ran ashore on Rich point, Newfoundland, and the *Acadia* was delayed to complete other arrangements. She eventually got away on the 5th August, reached Port Burwell on the 13th August, and Port Nelson on the 20th August, having encountered very little ice until reaching Hudson bay, where closely-packed winter ice was entered 60 miles off Port Nelson.

Surveying operations were carried on between the entrance to Port Nelson and cape Tatnam. The shore was traversed, the edge of the shallow bank defined, and soundings carried from 10 to 15 miles off shore.

A vessel approaching Port Nelson has now a chart embracing a wide area off the entrance, that is to say, between Nelson shoal on the north and cape Tatnam on the south, a distance of 45 miles, and as the water is not very deep, good soundings that will enable her to feel her way to the entrance without running ashore may be obtained.

The party experienced very rough weather and, considering the short season, got through a very fair amount of work.

The season was closed on the 19th October and, after various adventures detailed in Mr. Anderson's report, the steamer reached Halifax on the 4th November.

Mr. Anderson's report shows that ice, very heavy for the ordinary merchant-liner, was encountered as late as the 20th August, in Hudson bay itself, and that in the autumn he and other ships got into heavy ice that caused serious trouble on the 22nd October. The *Acadia* was only slightly damaged by this, but she is extra heavily plated and framed. The *Alette*, of ordinary build, had her bow so badly crushed that she was compelled to return to Nelson where she was beached and abandoned.

A perusal of this report shows that the steamer *Alette* was not provisioned for any lengthened period, that the *Acadia* had supplies for only two months for her own crew, and when she rescued the crew of the *Alette* the provisions would have lasted only one month or six weeks.

At one time the vessel was ashore on Coats island, and again she was jammed so tight in the ice that everyone on board wondered if she would ever get free.

This was a very serious matter, and might have resulted in the loss of the whole crew. I submit, therefore, that the lesson to be derived from this experience is the advisability of establishing large depots of provisions and fuel at convenient points on this extremely inhospitable shore of Hudson straits.

PACIFIC COAST PARTY.

This party is in command of Lieut. P. C. Musgrave, R.N., Retired, who was assisted by Messrs. R. L. Fortier, L. R. Davies, and O. Parker. On the 2nd June, Mr.

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Fortier left to join the Hudson Bay party, and on the 15th June, Lieut. John Knight, R.N., Retired, joined and was followed on the 12th August by Mr. J. A. Turner, a graduate of the Toronto School of Science.

The steamer *Lillooet* was commissioned on the 16th April and paid off on the 3rd November.

Between the 19th of April and the 10th May the party worked in Malaspina strait in continuation of the work started by the party in H.M.S. *Egeria* in 1910. Very little was done here except recovering and remarking the old stations, and some traversing on Tesada island.

Whilst the main party was at this work, Mr. Davies was detached, with a small party, at Alberni, and completed the survey of that harbour on a scale of 6 inches to the nautical mile.

On the 12th May the ship returned to Esquimalt to have new davits fitted, these not having arrived from England when she was commissioned. On the 23rd May she left Esquimalt, proceeded north and reached Prince Rupert on the 27th, and Skidegate inlet on the 30th, where work was resumed, in Hecate strait, at the point left off in 1912. During the balance of the season plans were made of Thurston bay, Selwyn inlet, Aliford bay, Pacvofi, Otard bay, and Port Louis.

Between the 10th July and 4th August the ship was stationed in the west approach to Dixon entrance to avail herself of what might be expected to be the finest part of the season, to get some much-needed soundings, but during the whole period the weather was so unpropitious that nothing was done.

Some changes at Masset harbour were noted, and the ship resumed her station in Hecate strait on the 11th August, and continued there until 27th October, when the season was brought to an end.

Sounding off-shore for 10 miles has been almost completed as far south as Skidegate inlet, considerable traversing done between that and Selwyn inlet, and a survey of the latter is almost completed.

In June, large cribs were sunk off Cape Ball, and tidal comparisons obtained with Port Simpson and Skidegate.

Surveying operations in these northern waters of British Columbia are much hampered by bad weather, fogs, wind, and rain. In 1913, out of 168 working days, 68 were lost by bad weather.

The party spent the winter in office in Esquimalt preparing fair sheets for the engraver.

LAKE ONTARIO PARTY.

This party, working from the steamer *Bayfield*, left Prescott headquarters on the 8th of May, and proceeded to Toronto, to start operations, which were carried on between Port Darlington and Hamilton all season.

Very fair progress was made and, as a result, a sheet covering the shore from Port Darlington to Toronto has been prepared for the engraver.

Several of the small harbours, such as Frenchman's bay, Port Credit, and Oakville have been surveyed and plans will be engraved. Toronto harbour has been carefully surveyed, and a proper chart of it will shortly be issued.

A careful examination of the soundings between Newcastle and Toronto shows that the 3-fathom contour follows the shore line at a uniform distance of three-quarters of a mile, and that except for two shoals off Proctor point, there are none in this part of the lake.

Soundings were carried off-shore about 12 miles, and during the season, 970 miles of sounding were done from the steamer, 585 from the boats, covering an area of 400 square miles. The party was in charge of Mr. G. A. Bachand, who started the season with J. U. Beauchemin, M. Cailloux, and E. B. MacColl, as assistants, but on the

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1st June, Mr. Cailloux was detached for work at Sorel, measuring discharges of the St. Lawrence river, and on the 14th July Mr. MacColl joined the survey party under Captain Anderson, proceeding to Hudson bay. On the 7th June the staff was increased by the addition of Mr. W. K. Willis. On the 8th of November the *Bayfield* was laid up at Prescott for the winter, and the party returned to office in Ottawa to prepare fair sheets for the engraver.

On the whole a very fair season's work was done.

LOWER ST. LAWRENCE RIVER PARTY.

Commander I. B. Miles, R.N., (Retired), who was appointed to take command of this party in 1906, resigned his position on the 20th March, and was succeeded by Mr. Charles Savary, who had been his assistant until the spring of 1912, when he took charge of the survey of lake Superior.

In losing Commander Miles the Survey lost a valuable officer, and one who had had a great deal of experience in navigation, a most important consideration for a hydrographic surveyor.

This party was in charge of Mr. Charles Savary, with assistants A. J. Pinet and E. Ghysens, and was increased by the appointment of Mr. M. A. MacKinnon on the 7th July. The *Cartier* was commissioned on the 11th of May, and left for surveying operations east of a line joining cape Columbia on the north with St. Flavie on the south. Work was carried as far east as a line joining Manicouagan river on the north to Sandy bay on the south, over an area of 670 square miles, in which 975 miles of sounding was done from the deck of the steamer, and 575 from the launches, in addition to 95 miles of traversing. Sounding was extended completely across the river.

In addition, a plan extending 10 miles upstream was made of Bersimis river. This will be plotted on a scale of 3 inches to 1 nautical mile. Some surveying was done in the Lower Traverse to check some soundings on the existing chart.

The party returned to Quebec on the 29th October, and the steamer was laid up.

Nothing of an untoward character occurred during the season. The steamer was carefully docked, examined, and found to be in first-class condition.

LAKE SUPERIOR PARTY.

Upon Mr. Savary's promotion to the Lower St. Lawrence party, Mr. Parizeau was appointed to the command of the Lake Superior party and took charge in the 11th of April, 1913. Captain J. L. Baxter succeeded to the position of Sailing Master made vacant by the retirement of Captain Brown in the previous autumn.

Mr. Joseph Cosford, Chief Engineer, resigned on the 25th October, and was succeeded by Mr. Norman Munro, by promotion from the position of second engineer.

Mr. Parizeau had for assistants, Messrs. H. H. Lawson and F. R. Mortimer, and his staff was increased on the 21st of May by the appointment of Mr. H. L. Leadman, a graduate of Toronto School of Science.

The steamer *La Canadienne*, with the party on board, was commissioned on the 6th of May, at Owen Sound, and reached Peninsula harbour on the 10th of May, to start surveying operations.

Even at that late date considerable ice was encountered in lake Superior.

A triangulation was completed to connect Schreiber point and Peninsula harbour and Slate islands.

As a result of the season's work a fair sheet was prepared for the engraver, embracing that portion of the lake south of the shore between Schreiber point and Pic island as far south as a line passing east and west and distant 10 miles south of Slate islands, and in this area no unknown shoals were discovered, although many

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that were uncharted were located. On the old chart, one marked as being covered by only 10 feet of water was carefully searched for but could not be found, and I think may safely be removed.

In addition to the general sheet mentioned above, a plan on a scale of 6 inches to the nautical mile was prepared for the engraver, of Jackfish bay.

The work performed amounted to 136 miles of traversing, 700 miles of sounding from the ship's deck, and 550 from the boats, covering an area of 650 square miles. This was a good showing, considering the weather on lake Superior where fogs and smoke are frequently encountered, and if the peculiar labour conditions are taken into account.

The original crew deserted almost to a man after reaching Jackfish bay to take advantage of the high wages ruling at Port Arthur and Fort William. For a month the party was reduced to less than a boat's crew, and the Captain had to go to Collingwood to secure men.

The steamer arrived at Owen Sound and was laid up on the 8th of November. She was examined and found in good condition, considering her great age. Being slow, of small beam and inclined to be cranky, she is hardly in the same class for survey purposes as the other and newer vessels attached to the Survey. Owing to her lack of power the officers have to be careful to make a good offing upon the slightest appearance of foul weather.

JAMES BAY PARTY.

Upon the promotion of Mr. Parizeau to the command of the Lake Superior party, Mr. Paul Jobin was appointed to succeed him. He had for assistants, Messrs. Robert Fraser and L. T. Bowes.

It was deemed advisable to send an advance party to Rupert House before the break up of the ice, and Mr. Fraser was despatched with this crew of men. These had instructions to re-erect several main triangulation stations, to study and observe the break up of the ice on Rupert river, and to prepare the schooner *Chrissie Thomey* for service.

This vessel was wintered in the mouth of the Rupert river, opposite the post, in the autumn of 1912. She froze into the shore ice which later on shifted and left the vessel farther down the river, but in good water.

When the ice broke up it caught her, lifted her and left her almost high and dry on her side. She filled with water, but later on she righted and was pumped out. She is badly strained, and it is doubtful if she could be sailed to Halifax even if she could be floated out of the river.

Mr. Jobin, with his other assistant, nine men and nine guides, in four canoes left Cochrane on the 5th of June, reaching Moose Factory on the 10th. It was not until the 20th that the party could leave, on account of ice, for Rupert House, which was reached on the 21st.

An attempt was made to get the schooner out, but when the tide was favourable the wind was not, and when the wind was the tide was out. No tug was available.

Camping was resorted to, and work was carried on between Point Comfort and Strutton island.

The examination shows a depth of 5 fathoms off Point Comfort, with least water of 4 fathoms in the approach. A good channel, rather narrow, continues to Black Bear point, where 3 fathoms can be found.

Mr. Jobin reports as follows:—

“No examination could be made of the Lisbon shoal, but it was found that the so-called Lisbon rock is an island of boulders, about 20 feet high and 300 yards long, in a SW.-NE. direction, and covered with tall coarse grass. There stands on it by way of mark a 25-foot stick of driftwood with a cross piece at

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the top. The position of the rock, in relation with Charlton island, given on the Admiralty chart of Hudson bay agrees fairly well with the one I had to estimate, as I could only get a sight to one fixed point.

"I could get no information about the voyage of the Hudson Bay Company's S.S. *Nascopie*, but the *Adventure* did not find very much ice between Port Harrison and the North Belcher islands, on August the 8th, and saw none in James bay.

"The break-up in the Moose river was marked by a big flood. Revillon's steamer *Emilia* being floated off the ways on Charles island, and the low land at the mouth of the river being covered with 6 feet of water.

"In the Rupert river the ice did not quite rot in place, as local reports had it, but went out as described above, without affecting the level of the river or damaging the banks, but not missing the *Chrissie Thomey* at anchor.

"Ice was moving in the south channel of Rupert bay until the 22nd of June, when it came up to Stag island with the tide. It is really piled-up ice, not as solid as Arctic floes, and no piece seems to be larger than 50 feet in any direction.

"The ice I saw from the *Inenew's* deck on June 17, 10 miles off the Moose river, was afloat and did not seem to be tightly packed, but going round Sawayan point on the 21st of June we were stopped by ice packed close against the shoal ground. The way was clear along the land, where only small pieces could come in on account of the shallow water, but from our low elevation and in the dirty weather I could not make out clear water to seaward. Mr. Fraser reports that on the 23rd of June there was ice all the way between Wood and Charlton islands.

"On the 21st of July, ice was still coming in to the northern end of Charlton sound, and at that date the *Inenew* met pack-ice in the same latitude off Cochispenny point on the west shore.

"The Rupert river froze across, above the trading posts, on the 10th of December, 1913. The season was milder than the average, I believe, the mean temperature between July 18 and September 23, period covered by the observations, being: maximum 61, minimum 46, with actual maximum of 98 and minimum of 35."

After leaving two men at Rupert to see the schooner safely frozen in, Mr. Jobin and party left Moose Factory on the 30th of September, reaching Cochrane on the 10th October, and Ottawa on the 16th. The men left behind reached Cochrane on the 1st of January.

AUTOMATIC GAUGE PARTY.

These gauges are looked after by Mr. C. A. Price, assisted by Mr. W. J. Miller.

On account of the investigation into the levels of the St. Lawrence river, between Montreal and Quebec, undertaken by a commission under the Department of Marine and Fisheries, it was found necessary to install several gauges in the river, as follows: At foot of acine canal, Longue Pointe, Vercheres, Varennes, Lanoraie, Sorel, Three Rivers, Batiscan, and Pointe Platon.

On the Great Lakes there are gauges at Kingston, Port Dalhousie, Port Colborne, Fighting island (Detroit river), Isle aux Peches (Detroit river), Goderich, Sault canal (below the locks), Sault canal (above the locks), and Port Arthur.

With the exception of the two at the Sault canal, and the two in the Detroit river, these are maintained during the season of navigation only. It is hoped that some method of keeping them from freezing up can be devised shortly, and thus enable us to get records for the whole year.

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NEW CHARTS PUBLISHED.

The following new charts have been engraved and issued to the public during the year:—

- No. 53, Lancaster Bar to Cornwall.
- No. 80, Plans of Harbours in Lake Erie.
- No. 306, Skidegate Inlet, Queen Charlotte islands.

The following photo-lithographic reprints have been made of old charts, principally Admiralty charts:—

- No. 95, Meldrum point to St. Joseph island.
- No. 207, Malbaie to Goose island, St. Lawrence river.
- No. 405, Hudson bay and strait.

The following photo-lithographic new charts have been issued:—

- No. 309, Stamp Harbour, B.C.
- No. 402, Nelson Roads, Hudson bay.
- No. 403, Approaches to Nelson river.

The following new editions of former issues were made:—

- No. 8, River St. Lawrence, head of Lake St. Peter.
- No. 9, “ “ Lake St. Peter.
- No. 19, “ “ St. Antoine to St. Augustin.
- No. 22, “ “ Montreal to Sorel.
- No. 23, “ “ Sorel to Batiscan.
- No. 24, “ “ Batiscan to Quebec.
- No. 50, “ “ Lake St. Louis.
- No. 201, Atlantic coast, White island to Orignaux point.

The editions of the St. Lawrence Pilot below Quebec having become exhausted, a new one has been prepared and forwarded to the King's Printer.

The edition of the Georgian Bay and North Channel Pilot and of the Sailing Directions of the Canadian Shore of Lake Huron having become rather out-of-date and almost exhausted, a new one is being compiled by Captain J. G. Boulton, R.N., Retired, and is now in the hands of the King's Printer.

During the past year the Survey suffered loss from the deaths of Messrs. Edouard Jodoin and A. Lacey. Both died on the 1st of April, 1913, the former of the typhoid epidemic in Ottawa, and the latter at his home in Sydenham, Ont.

The balance of the staff have rendered good valuable service, and, obtaining more experience in hydrographic surveying, are becoming more valuable.

The following appendices are attached:—

- I.—Report of Mr. Anderson on work at Port Nelson and in Hudson straits.
- II.—Table of water levels of the Great Lakes, 1913.
- III.—Description of bench-marks established by automatic gauges, and elevations thereof determined by water transfers.
- IV.—Table showing yearly water transfers and elevations of bench-marks used.
- V.—Tables showing yearly comparison of Canadian and United States water surface elevation of Great Lakes, 1906-13.
- VI.—Daily mean elevations of St. Lawrence river at Montreal.
- VII.—“ “ “ “ Longue Pointe.
- VIII.—“ “ “ “ Varennes.
- IX.—“ “ “ “ Verchères.
- X.—“ “ “ “ Lanoraie.
- XI.—“ “ “ “ Sorel.

WM. J. STEWART,
Hydrographer.

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APPENDIX I.

REPORT OF MR. F. ANDERSON ON WORK AT PORT NELSON AND IN HUDSON STRAIT.

OTTAWA, March 5, 1914.

W. J. STEWART, Esq., C.E.,
Chief Hydrographer, Dept. Naval Service,
Ottawa.

SIR,—I beg to submit the following report on the work of the survey in Hudson bay and strait during the season of 1913.

For the above expedition the new steamer *Acadia* was employed. She is a 12-knot, single-screw, steel steamer of some 1,700 tons displacement, built specially for surveying by Messrs. Swan, Hunter & Wigham Richardson, Newcastle-on-Tyne, England, and arrived in Halifax on 8th July last. During the past season she proved a first-class seaboat and gave a very good account of herself in any ice encountered. The vessel also handled very easily and proved economical in fuel, an important factor when operating so far removed from the base of supplies. The wireless equipment was found efficient, though the aerial was hardly large enough for the power generator, but this can be easily remedied.

The fitting out and provisioning being completed, the *Acadia* sailed from Halifax on the 5th August and North Sydney on the evening of the 7th, and came to in Port Burwell harbour, Hudson strait, at 11 a.m. on the 13th August.

Nothing worthy of note happened during the trip up; the track followed was about 100 miles off the Labrador coast. After passing Belle Isle an occasional iceberg was seen, but no field ice encountered until about 70 miles south of cape Chidley, where light ice-fields were passed through, and heavy, closely packed ice entered when about 20 miles off the cape. Grey strait was quite clear, only an occasional pan being seen.

The weather on the whole was fine, Sunday the 11th being cool, rainy, and foggy.

Reports received from the Labrador coast stated that ice conditions were the worst in many years, but this was all avoided by giving the coast a wide berth. Associated Press and other reports were received at Ottawa, the last of which was from Battle harbour on the 9th of August, and after losing communication with this point the northern stations could not be picked up by wireless.

While at Port Burwell a supply of fresh water was taken on board by boat from a stream in the north part of the harbour. While at Burwell reports were received concerning ice and weather conditions during last autumn and this spring. The heavy Arctic ice pack did not come down until the 8th of January, leaving it possible to clear the straits up to that date. The spring was reported very open, and the straits could have been entered as early as the first week of June.

Supplies brought up for Captain Chapman of the Customs schooner *Arthur W.* were landed in safety, and meteorological reports taken during the past winter received from him. The steamer *Nascopic*, carrying supplies for the Hudson's Bay Company, was reported as having arrived on Sunday the 10th, and had passed into the bay bound for Fort Churchill and Charlton island, James bay.

Burwell was cleared at 11 a.m. on the 14th; scattered winter ice was entered about an hour later. The next day was fine and clear, the thermometer stood at 31° F. at 8 a.m. The ship was swung at 8.30 a.m. and the standard compass was found to have as much as 1½ points deviation. Scattered ice-fields were seen along shore about Big island, and Erik cove was reached at 9 a.m. on the morning of the 16th.

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The following report was received from Mr. Shepherd, officer in charge, Hudson's Bay Company post:—

“The straits could have been navigated last autumn until well into December, but after the 15th of November the weather was so stormy and generally unsuitable for navigation that no vessel should have attempted a passage after that date. In the spring a safe passage could have been made by the 12th of July and there would have been little advantage attempting it before that date, as there was so much drift ice (closely packed at times) about.”

Erik cove is one of the most isolated posts of the company, in fact all connection with the outer world is cut off for nine months of the year. At the request of Mr. Shepherd the doctor went ashore to attend to his nine-months' old child. The former having lost his wife some months before and the milk supply running short, the child was in a bad way; a supply of condensed milk was sent ashore, for which he was very grateful.

Erik cove was cleared by noon and the ship was about 3 miles off the north end of Mansel island at 8 p.m. On changing course it was noticed that the northwest point of the island projects much farther into the straits than shown on the chart. The north end of this island should be properly defined and sketched in, as the position is only approximate, and the shape more or less guessed at.

Monday, 18th August, was a fine day, light WSW. wind, the ship making 8 knots on a consumption of 10 tons of coal in 24 hours.

The ship entered field-ice, loosely packed, about 3.30 p.m., but the air being so cool gave one the impression that much heavier ice would be found later.

The *Bellaventure* and *Bonaventure* were picked up by wireless at 10 p.m. about 150 miles distant.

On the following morning about 4 a.m. heavy closely-packed winter ice was entered about 60 miles off Nelson shoal, and very slow progress was accordingly made. It is possible this ice could have been avoided by holding a more northerly course from Mansel island. The ship anchored off Nelson shoal at 5 p.m. After breakfast next morning, 20th August, a landing was made on the shoal and it was found that the beacon erected last season was lying down, but quite uninjured, not one board gone. Two of the three guy wires had pulled out, the anchors not being well ballasted, but the third having boulders placed held fast.

From the above it appears that the ice shove cannot be very serious, and the change in the position of the bank from year to year cannot be very great. The beacon was re-erected and all guys well anchored. During the afternoon a buoy was placed off the entrance to the channel entering Port Nelson in 21 feet of water, and the ship came to nearby for the night. Beacon on Marsh point bearing S. 38° W., distant 11 miles.

The next day the wind was fresh from the NW., and foggy. The *Bellaventure* and *Bonaventure* were found anchored up the channel, having arrived safely with the tug *Kathleen* and barge *Neophyte*. After dinner outgoing mail was sent to the *Bellaventure*, due to sail in the morning. The freighter *Alcazar* was also riding at anchor a couple of miles up the channel. All the ships reported a very heavy trip up, being much delayed by ice. Indeed the tramp steamer *Alcazar* did extremely well making through in safety. Attached to this report are extracts from the logs of the different ships concerning the ice conditions met with.

During the period from 20th August to 10th October, surveying operations were carried on with a view to delineating the southeastern approach from a point outside of cape Tatnam. The shore line was traversed from abreast Marsh Point beacon to a point 10 miles east of cape Tatnam, a distance of 40 miles. For this purpose a shore party was landed, consisting of an officer and four men, a gasoline dory being used to transport the camping outfit. Steel buoys carrying flags 20 feet above the

water, and visible about 8 miles in clear weather, were used to fix the soundings and cut in the shore line. The first buoy was placed in 21 feet of water off the entrance channel to Port Nelson, N. 3° W., 11 miles from Marsh Point beacon, and making a good mark for picking up the channel, besides being a survey point. The remainder of the buoys were placed from 4 to 7 miles apart and the same distance off-shore, the last one lying off cape Tatnam.

The soundings were extended out from off the Hayes and Nelson rivers to about 10 miles past cape Tatnam, and from 10 to 17 miles off-shore. The whole of this southeast shore proved to be low and swampy, pierced by many small streams all practically dry across the mouth at low tide. The locality is wooded by black spruce, 20 to 30 feet high, to within half or three-quarters of a mile of the shore, showing up well from a considerable distance seaward. Off the shore, extending from the mouths of Hayes and Nelson rivers to a point 10 miles east of cape Tatnam, the soundings were carried 10 to 17 miles.

The following work was performed:—

Area sounded over—600 square miles.

Line sounding—1,400 miles.

Main stations built—5.

Coast line traversed—40 miles.

Without exception the weather was the worst on record, moderate to full gales prevailing, finally reaching a climax on October 12, when a heavy blizzard swept over the bay, the wind blowing at a rate of from 60 to 75 miles per hour, accompanied by snow. Thermometer, 17° F.

Two-thirds of the time was completely lost, owing to conditions under which work was impossible, and half the time when surveying was carried on it was under great difficulties. Notwithstanding the above adverse conditions, the object of the expedition was accomplished, and a chart is in the course of preparation showing the entrance to the Nelson and Hayes rivers and extending as far as Nelson shoal on the north and cape Tatnam on the southeast.

Monday, 8th September, was the first fine day, and the steamer *Beothic*, chartered by the Department of the Naval Service, arrived at noon; a large sounding launch was received from her, also mail and supplies; she then moved inside the river to deliver her cargo to the Hudson Bay terminus. On Friday, the 12th, the freight steamer *Cearense* with supplies for the Hudson Bay terminus, was picked up by wireless. She was offered every assistance possible, but the message was not acknowledged. She came to directly windward of the *Acadia* at about a mile distant, a very awkward berth to take up in case of her anchors dragging. On the following morning the *Cearense* got under weigh early and on trying to make the entrance to the river she went aground on a pile of boulders on the south side of the channel. It was found impossible to float her, and since then she has become a total wreck. The *Beothic* received instructions to stand by and render all possible assistance, which were carried out. The crew were transferred to her and taken home. The wreck of the *Cearense* lies, in very little water at low tide, N. 20° W. $7\frac{3}{4}$ miles from Marsh Point beacon, and about 1 mile south of the middle line of the channel.

On Wednesday morning, 24th September, a report was received by wireless from Mr. MacColl, in charge of the shore party, that he and his party were on board the *Beothic*, that his dory had been swamped some days before about 8 miles west of Tatnam, losing all supplies, and that they had been forced to walk the full distance to York Factory, without provisions for two days. From York they had taken coast boat to the ship. This was a most unfortunate occurrence so late in the season, and we could ill afford to lose the time. As it was not convenient to land this party again until 6th October, great difficulty was experienced in picking them up on 18th October owing to the drift ice in the river.

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On 25th September, in a fresh west wind, with rain and snow, the *Acadia* tied up to the *Beothic* at 5.30 p.m. to take on coal. On the 28th the *Bellaventure* arrived with the dredge *Port Nelson* in tow. They were lucky in having fine weather on the Labrador coast, and also crossing Hudson bay. Later the dredge was beached at Root creek for the winter.

The *Beothic* sailed for home on 30th September, having discharged cargo, landed about 1,500 sacks of coal at Port Nelson terminus, and coaled the *Acadia*.

On 5th October, fine and calm, the Hudson's Bay Company's auxiliary schooner *Fort Churchill* arrived from Churchill. This schooner had been built in Great Britain for distributing supplies to the various posts on the west coast from Churchill. This is a departure from the time-honoured custom of landing supplies at York Factory as well. The schooner arrived too late to handle any supplies left at Churchill, and they must be distributed by dog train during the winter. Since leaving Hudson bay, reports have been received that this schooner has gone adrift in Hudson bay.

Wednesday, 8th October, overcast and wind WNW., fresh. Sounding from the ship all day. The freighter *Sinbad* returned to the river, having sailed for home on the 1st. The captain reported the passage at west end Hudson strait closed by ice, and he considered it unwise to proceed.

The 11th October was a very disagreeable day, wind SW., fresh and very misty. The barometer had fallen to 28.65, the lowest of the season, indicating plainly that a heavy gale might be expected. An attempt was made to make Port Nelson, but owing to the late hour of arrival off the entrance, and the impossibility of seeing over a quarter of a mile, we came to about 3 miles outside the wreck of the *Cearense*. Next morning the heaviest gale of the season swept over the bay, the wind blowing at about 60 miles per hour, accompanied by snow, and a temperature of 17° F. Although both anchors were out, with about 100 fathoms of chain, the ship dragged about 1½ mile before taking hold. Steam was ready at five minutes' notice in case of emergency. During the morning our 34-foot sea-going launch broke adrift, the windlass pulling out through the deck, owing to being improperly fastened. The launch was completely encased in ice and, because of bad weather, nothing could be done to save it. A report was received early in January from Mr. Ray, officer in charge, Hudson's Bay Company's post at York Factory, that the Indians had found this launch in the ice off the south shore bank, apparently uninjured.

Next morning the wind having moderated, steam was raised after breakfast and a little later we came to well up the river, nearly abreast Root creek. Mail was sent on board the *Bonaventure*, as she left for home during the morning, accompanied by the *Sinbad*, and a few hours later the *Bellaventure* departed.

A further supply of coal was received from the barge *Neophyte*, and spare gasoline and some gear sent ashore to the terminus party. While coaling on the morning of the 14th, a ship was sighted off the entrance to the river. Steam was raised at 3.30 p.m. and the tug *Kathleen* accompanied us down the channel to lift buoys and get definite information about the new arrival, which proved to be the *Alette*, which had left on the 7th homeward bound. The *Acadia* came to anchor off the entrance to the river, the beacon bearing about south, distant 12 miles. During the evening, in answer to signals, an officer was despatched by launch to the *Alette* to make inquiries. The report was brought back that her bow had been stove in by ice encountered off the north end of Mansel island on the 10th October. A rent of considerable extent had been made in the plates on the port side, about 3 feet below the water line, and as the pumps could barely hold the water back, the ship had to be beached to try and save the cargo. Nothing could be done on the following morning, as another gale, with snow, set in with temperature 10° F. Following the gale of the 12th instant, the weather had turned much colder, and new ice formed up the river, large fields were seen passing out, from 1 inch to 2 inches in thickness.

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Sixteenth October. Fine morning, but the thermometer stood at 8° F. It was the original intention to despatch the launch to York Factory and pick up the shore party, but this was quite out of the question now, on account of the river ice, which would have cut through the launch planking in no time. Captain Robertson of the *Alette* came on board the *Acadia* and requested me to stand by him, as his ship was not seaworthy. I agreed to pilot him up the river and point out a suitable place for beaching, to save the cargo. The *Alette* was to anchor in the river before beaching, to facilitate the transfer of crew and provisions. When about 4 miles outside the site of the terminus, the *Alette* was driven at full speed on the bank. The *Acadia* came to in the channel abreast, but ice drifting up and down, with each successive tide, made communication between the ships most difficult and dangerous. The lifeboats of the *Alette* were stove in and filled with water in coming alongside. The *Alette* was abandoned on the 17th October, all the crew and some provisions having been transferred to the *Acadia*. The crew of the above vessel consisted of twenty-eight all told (fifteen being Chinamen), and as they proved to be very short of provisions, it was a matter of some concern taking them in the *Acadia*, especially as the reports concerning ice conditions received from the returned vessels were not encouraging, and the *Acadia* had provisions for only two months longer.

About noon on the 18th the shore party returned on board, after considerable difficulty from the ice. Port Nelson was finally cleared at noon on Sunday, the 19th. fresh northerly winds, accompanied by snow, prevailed, making it difficult to see far.

During the season all possible assistance was given to steamers entering the port. Although no regular buoys had been placed, the survey flag buoys were available, and their positions and courses and distance between were given, when possible, to assist and avoid accident. Port Nelson is easy of approach even at present, one reason being that good indication can be obtained with the lead. One course will lead practically right up the channel from outside. The great difficulty is in finding the entrance to the river, but No. 1 survey buoy marked this well, and no accident or wreck that took place can be attributed to the lack of aids or difficulty of approach.

Coates island was reached at 8 a.m. on Wednesday, the 22nd. Wind west, fresh, and very foggy, thermometer 10° F., great fields of ice about. The ship was hove-to for some hours and finally came to anchor a couple of miles off the south side of the island. The next morning was fine, light SW. wind, and clear. The day was spent cruising about off the ice-pack, trying to discover a passage, and by evening having traversed the passage to Mansel island it was found completely closed by heavy ice, not only closely packed together, but with the spaces between the larger pans frozen over by new ice about 1 to 3 inches in thickness, the whole thus being cemented together. The situation looked serious in the extreme, especially as the temperature was little above zero and one night of hard frost would certainly have made the ice-pack impassable.

On the following morning the ice-pack was entered with difficulty at slow speed, and it was soon found that to make progress at all, it must be at full speed. This would entail the great risk of injuring the ship or the propeller; however, as we had a large ship's company, seventy-eight in all, and provisions and coal for barely two months, it was decided to push on at full speed. Every precaution was taken to prevent accident, especially on the "back up," as occasionally it was found necessary to back up and butt at full speed several times before forcing a passage. On the evening of the first day, matters did not look over promising, the ship being hemmed in on all sides with large pans, closely packed, on which we were unable to make the slightest impression. Nearly every one on-board decided they would never see home again.

On the following morning the pack had loosened up a little, and after working about for some time we managed to secure a start. As the ice appeared rather loose towards Mansel island, the ship was worked in that direction, and about noon fairly

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good leads were made, and later a clear channel was finally reached about 2 miles off the north end of the island. Following this lead up, open water was reached at about 4 p.m.; needless to say all hands brightened up considerably with the sight of open water. One point worthy of note is that when in the ice-pack, with no open water in sight, the white reflection of the ice in the sky about the horizon showed that it extended for many miles, but one small dark patch was visible in the sky which did not appear to change position, and as it looked suspiciously like open water, it was more or less steered for and proved to be such. Heavy ice was again entered about 9 p.m. off Digges islands, and as it was very closely packed, and very heavy, we had to await daylight. The next day, Sunday the 26th, was very fine, and as the pack had opened considerably, a move was made after daylight. A clear channel was noticed from the masthead, close along Digges islands, which we entered about noon and good progress made. More or less field ice was passed until Charles island was abeam, and from this point no field ice was seen, only an occasional berg. The passage inside Charles island appeared closed by field ice.

Port Burwell harbour was reached on Tuesday, the 28th; arrangements were made for the mission storekeeper to keep weather and ice records during the autumn closing, winter, and spring opening. While at Port Burwell, several Eskimos came aboard, and a great similarity was noticed between them and the Chinamen.

Next morning the harbour was cleared early and, the weather being fine, good progress, at about 13 knots, was made on a consumption of about 14 tons coal in twenty-four hours. Belle Isle was reached on Friday the 3rd, when wireless reports were despatched to Ottawa, and Halifax reached at noon on the 5th of November. About thirty-six hours were lost in the gulf from heavy southerly gales.

November 4 was spent at Sable island in making an examination of the east spit for an island reported to exist. Nothing new was discovered detached from the island bank; however, a spot was found on east spit awash at high water and probably 3 feet above at low water, lying E. by N., 10 miles from East lighthouse. The chart shows 12 feet of water on this spot.

On arrival at Halifax the fifteen Chinamen, members of the *Alette* crew, were handed over to immigration authorities.

I cannot close without thanking the Survey staff, and the officers and crew of the ship, for their close attention to duty, and loyal support during a very trying season.

ICE CONDITIONS DURING THE PAST SEASON.

The serious ice condition found at the west entrance to Hudson strait, north of Mansel island, during October, is most exceptional and hard to account for. There is little or no tide and current at this point, and a mass of ice once caught would be very likely to remain. As a rule the Fox channel ice never remains long during the season, but passes out of the strait. During the summer of 1912, little or no ice came down, being a fine calm season, and even on the 2nd November the *Minto* found no ice in this passage. On the contrary, during the past season, extremely and exceptionally heavy northerly winds prevailed, which would have a tendency to carry a great quantity of ice down. An ordinary freight vessel could not for a moment have attempted a passage when the *Acadia* passed out.

There is no information on hand concerning the passage south and east of Mansel island, and it may possibly have been clear of ice. When the *Acadia* arrived off the north end it was rather late in the season, and too expensive on coal to risk a trip around to explore. If the navigation into Hudson bay and straits warrants the expense, by operating a powerful tug equipped with wireless in connection with a wireless station on the north end of Mansel island, masters of ships could be kept informed regarding the ice conditions, and conduct themselves accordingly.

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Attached to this report are:—

- I.—Summary of ice conditions found by steamers *Bonaventure*, *Bellaventure*, and *Nascopie*.
- II.—Statement giving arrivals and departures of ships at Port Nelson during season 1913.
- III.—Meteorological observations taken on board C.G.S. *Acadia*.
- IV.—Chart showing track followed by C.G.S. *Acadia* in her passage from Cape Chidley to Port Nelson, August, 1913.
- V.—Chart showing track followed by C.G.S. *Acadia* in her passage from Port Nelson to Cape Chidley, October, 1913.

I am, sir, your obedient servant,

F. ANDERSON,
Officer in Charge, Hudson Bay Survey.

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SUMMARY OF ICE MET WITH BY THE FOLLOWING STEAMERS DURING
THE SEASON OF 1913, IN HUDSON BAY AND STRAIT,
AND ENTRANCE TO JAMES BAY.

S.S. "BONAVENTURE."

The above steamer completed two round trips to Port Nelson last season.

After passing Belle Isle on July 10, numerous icebergs and field ice were seen during the remainder of the trip to Port Nelson. The track followed off the Labrador coast was outside the field ice, and about 150 miles off shore. Hudson strait was entered near Resolution island on July 16, and on the next day heavy field ice was met with which extended as far as cape Hopes Advance about 100 miles, taking five days to pass through. Light field ice was encountered every day until July 27, when heavy winter ice was entered in latitude $59^{\circ}40'$, longitude $88^{\circ}59'$, about 139 miles east of cape Churchill, taking eight days to clear. Nelson river was reached on August 6.

Weather, fog 35 per cent of the time.

On the return trip, Port Nelson was cleared on August 30, and Belle Isle reached September 7. No field ice was seen, only a few icebergs passed off cape Chidley on September 4.

Weather, rain or snow 60 per cent of the time.

On the second trip up Belle Isle was passed on September 20. Several icebergs were seen off the Labrador coast, but no field ice, the track followed being 90 miles off. Resolution island was reached on September 23 and Port Nelson September 28. During this latter period heavy gales and snow squalls prevailed. On the trip home, Port Nelson was cleared on October 14. Heavy Fox channel ice, closely packed, was seen off the north end of Mansel island on October 16. However, a clear passage, 5 miles wide, was found just north of the island. The last field ice was passed abreast Charles island, and occasional icebergs off the Labrador coast. Belle Isle was reached on October 22.

Summary of weather during the season: Fine, 44 per cent; fog, 27 per cent; rain and snow, 29 per cent.

S.S. "BELLAVENTURE."

This steamer completed two round trips to Port Nelson during the season.

On the first trip up she had the tug *Kathleen* and the barge *Neophyte* in tow through Hudson strait and bay.

Ice bergs were first seen off cape Ray on the 9th of July, and ice was more or less in sight during the remainder of the trip. The first field ice was encountered shortly after passing Belle Isle on July 11, and course was laid outside the ice fields, passing about 150 miles off the Labrador coast.

Hudson strait was entered, rather towards Resolution island, on July 18, and shortly afterwards heavy northern ice was encountered, which made progress very slow, taking six days to cover 75 miles. The ice-pack opened and closed with each successive tide. Heavy winter ice was entered on August 4, in latitude $59^{\circ}35'$, longitude $91^{\circ}48'$, about 75 miles off Churchill, and cleared on August 8. The ship came to anchor in Port Nelson on the 10th.

Fourteen out of the thirty-four days taken for the trip up were foggy.

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On the return trip, Nelson was cleared August 22, and the first iceberg was seen off cape Wegges, August 25. Numerous icebergs were seen, but no field ice, and dense fogs prevailed off the Labrador coast, passed at a distance of 50 miles.

On the second trip, Sydney was cleared on September 7, with the dredge *Port Nelson* in tow. Numerous icebergs were seen off the Labrador coast, passed at a distance of 50 miles. The first field ice encountered was north of Mansel island, on September 23, and cleared the same day, arriving at Port Nelson on the 28th.

The weather on the whole was fine. On the return trip, Nelson was cleared on October 13. Heavy field ice was found south of Coates island on the 15th; however, a clear passage, 5 miles in width, was found north of Mansel island, and the field ice extended past Digges islands. The freighter *Sinbad* was accompanied until this ice was passed, on the 17th.

Many icebergs were seen, and dense fogs prevailed off the Labrador coast, passed at a distance of 75 miles. After passing Belle Isle on October 22, the weather was clear, and very few bergs were seen.

Weather for the trip: Fine, four days; rain and snow, three days; fog, three days.

Summary of weather for the two round trips: Fine, 55 per cent; rain, 19 per cent; fog, 26 per cent.

S.S. "NASCOBIE."

Numerous icebergs were seen after passing Belle Isle on August 3, and heavy fog prevailed on the following day which lasted for three days. The Labrador coast was passed at an average distance of 90 miles, on both going and returning. Field ice was encountered on August 8, off cape Chidley, and extended nearly all the way to Charles island, which was passed on August 12. Port Churchill was reached on August 16, and cleared August 30, for Charlton island—reached on September 3. Fog prevailed from Mansel island to Charlton island.

The *Nascopie* left Charlton island September 19 and shaped her course for Port Churchill, where she arrived September 26. Heavy winds, accompanied by rain and sleet, were encountered.

On the return trip to St. Johns, Nfld., a fresh wind prevailed, with occasional showers of snow, sleet, or rain. Heavy field ice was encountered on October 1 and 2 off Mansel and Digges islands, where considerable pushing and butting had to be done to force a passage. Very few icebergs were seen on the passage back.

Summary of weather during the trip: Fog prevailed 60 per cent of the time; rain or snow, 18 per cent, and 22 per cent was fine and clear. Heavy winds after September 18.

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PORT NELSON, HUDSON BAY.—Arrivals and Departures of Ships for Season of 1913, August 1 to October 20.

Name of Vessel.	Date of Arrival.	Port cleared from.	Cargo.	Gross tonnage about.	Remarks.	Date of departure.	Port bound for.	Remarks.
SS. Bellaventure.....	Aug. 10..	Halifax.....	Rails and provisions.....	1,200		Aug. 22..	Halifax...	
SS. Bonaventure.....	" 14..	"	"	1,200		" 30..	"	
Barge Neophyte	" 14..	"		200	For use at Port Nelson, unloading ships.			
Tug Kathleen.....	" 14..	"		40				
SS. Alcazar.....	" 14..	Norfolk, Va.....	Lumber.....	3,000		Sept. 22..		
C. G. S. Acadia.....	" 19..	Halifax.....		450	Hydrographic surveying.	Oct. 19..	Halifax..	Port Nelson harbour full of ice.
SS. Sinbad.....	Sept. 4..	"	Coal and rails.....	800		" 1..	Sydney.	Returned again October 8, as passage blocked by ice.
SS. Beothic.....	" 8..	"	General cargo.....	1,200		Sept. 30..	Halifax..	
SS. Cearense.....	" 13..	"	Coal and machinery.....	3,000	Went ashore while entering. Total wreck, crew returned in <i>Beothic</i> .			
SS. Alette.....	" 13..	"	Scow and lumber.....	3,000		Oct. 7..	"	Returned again October 14 in sinking condition damaged by ice off Mansel island. Ship beached. Crew returned in C. G. S. Acadia.
SS. Bellaventure.....	" 28..	Sydney..	Coal.....		Dredge in tow safely landed at Root creek for winter.	" 13..	"	
SS. Bonaventure	" 29..	Halifax...	General cargo			" 13..	"	
SS. Sinbad.....						" 13..	Sydney.....	Left in company <i>Bellaventure</i> .

NOTE.—The weather during the past season has been the worst on record—heavy gales prevailing. New ice from 1 to 2 inches in thickness drifting up and down the river with the tide from October 15, making communication with the shore most difficult.

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METEOROLOGICAL OBSERVATIONS taken on Board C.G.S. Acadia.

Date.	BAROMETER.			THERMOMETER.			WIND.			LOCALITY.		Remarks.
	Max.	Min.	Mean.	Max.	Min.	Mean.	Direction.	Force.	Clouds.	Lat.	Long.	
1913												
July 29	29.6	29.4	29.5	66	65	65.5	SSE	4	0	44-49	62-06	Left Halifax at 4.30 a.m. Fog-clear.
" 30	29.4	29.2	29.3	72	64	68	E.	1	0	46-17	60-06	Cape Breton. Clear.
" 31	30.21	29.2	29.7	71	62	66.5	NW.	1	0	Halifax		Clear and fine.
Aug. 1	30.3	30.1	30.2	71	61	66	S.	1	0	Halifax		Clear and fine.
" 2	30.1	29.9	30.0	62	61	61.5	E.	1	5	Halifax		Raining in the evening.
" 3	29.9	29.85	29.87	62	61	61.5	S.	2	0	Halifax		Clear and fine.
" 4	29.85	29.7	29.77	64	63	63.5	SE.	0	10	Halifax		Rain and fog.
" 5	29.9	29.7	29.8	63	56	59.5	NE.	2	1	44-47	52-13	Slight haze with rain, p.m.
" 6	29.95	29.9	29.92	71	56	63.5	NW.	4	0	North Sydney		Clear and fine.
" 7	29.9	30.1	30	64	60	62	W.	3	0	North Sydney		Clear and fine.
" 8	30.1	30.0	29.0	64	53	58.5	W.	1	0	48-20	59-40	Clear and fine.
" 9	30.0	29.4	29.7	61	57	59.0	SSW.	10	4	51-30	57-20	Clear and fine; passed several icebergs.
" 10	29.7	29.4	29.55	50.0	40.0	45.0	NW.	2	10	54-25	54-30	Showers—few icebergs, a.m.
" 11	29.0	29.6	29.3	45	38	41.5	NNW.	5	5	56-40	58-10	Rain, a.m., but clear p.m.
" 12	30.05	29.9	29.99	42	36	39.0	W.	2	0	59-04	61-50	Few icebergs, with drift ice in evening.
" 13	29.9	29.8	29.85	47	32	39.5	W.	4	0	Port Burwell		Encountered ice field, a.m.
" 14	29.9	29.75	29.82	36	32	34	SW.	1	0	60-28	60-08	Clear and fine. Drift ice.
" 15	29.9	29.7	29.8	55	31	43	SE.	1	0	52-08	71-00	Clear and fine.
" 16	30.00	29.82	29.91	56	33	44.5	NE.	2	0	62-37	77-12	Erie Cove. Clear and fine.
" 17	30.00	29.82	29.91	56	37	46.5	N.	4	0	61-13	83-42	Clear and fine.
" 18	30.2	30.0	30.1	54	41	47.5	S.W by W.	4	0	59-10	89 00	Clear and fine. Encountered ice field.
" 19	30.2	28.9	30.05	45	38	41.5	SW.	2	1	58-20	92-22	Clear and fine. Heavy ice, a.m.
" 20	29.9	29.75	29.82	65	50	57.5	SSW.	3	4	57-03	92-12	Nelson roads. Haze with fog, a.m.
" 21	30.1	29.75	29.97	53	48	50.5	NNW.	3	0	Nelson Roads		Hazy, a.m. Clear, p.m.
" 22	30.1	30	30.05	50	41	45.5	E.	4	10	Nelson Roads		Rain.
" 23	30.15	30	30.07	58	44	51.0	N.	3	0	Nelson Roads		Clear and fine.
" 24	30.15	29.55	29.35	57	44	50.5	SW.	4	0	Nelson Roads		Rain.
" 25	29.55	29.3	29.42	62	50	56.0	S.	3	4	57-14	91-46	Rain, a.m. Clear, p.m.
" 26	30.1	29.3	29.7	48	46	47.0	NW.	5	10	57-14	91-46	Light rain.
" 27	30.1	29.5	29.8	56	37	46.5	NW.	2	0	57-18	91-27	Fine and Clear.
" 28	29.6	29.2	29.4	56	51	53.5	NW.	7	10	57-18	91-27	Fog.

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29	29.8	29.6	29.7	55	39	47.0	NW.	7	8	Nelson Roads	Fog, a.m.
"	29.75	29.55	29.65	53	41	47.0	NE.	3	10	Nelson Roads	Rain.
"	29.75	29.8	29.77	50	41	45.5	NE.	1	0	Nelson Roads	Clear.
Sept.	29.9	29.3	29.6	46	39	42.5	E.NE.	4	10	Nelson Roads	Heavy rain.
"	30.15	29.35	29.75	43	38	40.5	NW.	4	10	Nelson Roads	Squally.
"	30.45	30.15	30.3	56	38	47.0	N.	3	2	57-12	Fine.
"	30.35	29.85	30.1	44	36	40.0	ESE.	6	10	57-12	Rain.
"	29.85	29.6	29.72	55	43	49.0		0	4	57-15	Fog, p.m.
"	29.7	29.5	29.6	50	42	46.0	NW.	4	10	57-28	Fog.
"	30.15	29.7	29.92	53	44	48.5	W.	2	0	57-17	Clear and fine.
"	30.3	30.0	30.15	55	40	47.5	SE.	4	0	Nelson Roads	Clear and fine.
"	30.0	29.35	29.67	57	45	51.0	SW.	3	0	Nelson Roads	Clear and fine.
"	29.5	29.35	29.42	57	47	52.0	W.	5	0	57-14	Clear and fine.
"	29.9	29.5	29.7	45	37	41.0	NNW.	7	10	57-14	Heavy rain.
"	30.1	29.9	30.0	42	32	37.0	NW.	10	9	57-14	Rain. Clear in evening.
"	30.15	29.9	30.02	49	30	39.5	NNW.	2	4	57-14	Fine.
"	29.9	29.4	29.65	52	35	43.5	SSE.	6	10	57-28	Rain.
"	29.7	29.4	29.55	47	40	43.5	SW.	6	10	57-30	Rain. Clear in afternoon.
"	30.1	29.7	29.9	40	34	37.0	NW.	6	10	57-30	Snow flurries.
"	30.1	29.5	29.8	50	35	42.5	SSW.	3	6	57-30	Clear and fine.
"	29.7	29.4	29.55	50	45	47.5	W.	1	0	57-32	Fog all day.
"	29.9	29.6	29.65	35	33	34	NE.	10	10	57-32	Snow.
"	29.9	29.6	29.75	38	30	34	NNW.	8	10	57-32	Rain, a.m., and snow, p.m.
"	30.1	29.9	30.0	33	29	31	NNW.	9	10	57-32	Flurries of snow.
"	30.18	30.1	30.14	37	29	33	S.	3	10	57-32	Overcast.
"	30.1	30.0	30.05	36	30	33		0	2	57-17	Fine, a.m. Snow, p.m.
"	29.8	29.6	29.95	28	28	28	NW.	6	10	57-17	Rain.
"	29.9	29.8	29.7	38	24	31	W.	6	10	Nelson Roads	Rain.
"	29.9	29.8	29.85	33	23	28	N.	5	2	Nelson Roads	Clear.
"	29.85	29.65	29.75	33	17	25	SE.	5	1	Nelson Roads	Clear.
"	30.0	29.7	29.85	30	24	27.0	NNW.	5	0	Nelson Roads	Clear and fine.
"	30.5	29.75	29.9	33	15	24.0	S.	6	10	Nelson Roads	Rain and snow.
"	29.75	29.65	29.7	50	27	38.5		0	0	57-21	Clear and fine.
Oct.	29.7	29.65	29.67	42	35	38.5	NE.	2	0	57-21	Clear, a.m. Fog, p.m.
"	29.65	29.25	29.45	45	34	39.5	SSE.	2	10	57-17	Rain.
"	29.6	29.15	29.37	45	36	40.5	NW.	3	10	57-20	Rain.
"	30.15	29.6	29.87	39	31	35.0	NNW.	5	10	57-20	Snow.
"	30.2	30.15	30.17	43	28	35.5		0	0	57-20	Clear and fine.
"	30.3	30.0	30.15	37	28		SSW.	2	0	Nelson Road	Clear and fine.
Oct.	30.0	29.4	29.7	39	29	34	SSE.	6	10	Nelson Roads	Snow squalls.
"	29.9	29.5	29.7	37	27	32	NW. by W.	7	0	57-14	Clear.
"	30.1	29.9	30.0	38	27	32.5	NE.	6	8	"	Rain, a.m.
"	30.1	28.9	29.5	38	28	33.0	SE. by E.	8	10	57-14	Snow.
"	28.9	28.65	28.77	32	30	31		10	10	Nelson Roads	Snow squalls, blizzard.
"	29.8	28.8	29.3	19	17	18	NW.	12	10	"	Heavy snowstorm.
"	29.95	29.8	29.87	32	12	22	NE.	3	6	"	Occasional snow. River ice.
"	29.85	29.35	29.6	37	9	23	SE.	10	10	"	Blizzard, sleet.
"	30.0	29.45	29.72	17	10	13.5	W.	10	10	"	Blizzard, sleet.
"	30.3	30.0	30.15	13	8	10.5	N.	4	0	"	Clear and fine.
"	30.25	29.8	30.02	25	10	17.5	S.	5	0	"	Clear and fine.
"	29.9	29.9	29.9	34	25	29.5	NW.	4	0	"	Clear and fine.

METEOROLOGICAL OBSERVATIONS taken on Board C.G.S. Acadia—Continued.

Date.	BAROMETER.			THERMOMETER.			WIND.			LOCALITY.		Remarks.
	Max.	Min.	Mean.	Max.	Min.	Mean.	Direction.	Force.	Clouds.	Lat.	Long.	
1913.												
" 19	29.9	29.85	29.87	25	10	17.5	NNW.	5	10	"	"	Clear and fine.
" 20	29.85	29.75	29.8	22	20	21	NNW.	6	10	58-50	89 30	Snow.
" 21	29.75	29.25	29.5	17	17	17	NNW.	3	0	61-12	84-55	Fine and clear. Encountered ice, p.m.
" 22	29.5	29.15	29.32	15	8	11.5	W.	7	10	62-20	82-03	Fine haze with snow, p.m. In ice field.
" 23	29.7	29.5	29.6	23	9	16	SSW.	2	0	62 25	81-40	Fine, a.m., and hazy, p.m.
" 24	29.75	29.6	29.67	25	15	20	NNW.	2	0	62-07	80-02	Fine. In heavy ice all day.
" 25	30.0	29.75	29.87	17	8	12.5	NE.	2	0	62-15	80-02	Fine. In heavy ice all day.
" 26	30.1	29.95	30.02	15	4	9.5	NE.	3	10	62 30	73-30	Snow flurries. Closely packed ice, p.m.
" 27	30.1	29.75	29.92	19	18	18.5	NE. by E.	4	10	62 05	69-50	Snow. Passed occasional ice-berg.
" 28	29.9	29.7	29.8	25	18	21.5	NNW.	4	6	60-24	64-52	Snow, a.m. At Port Burwell.
" 29	29.9	29.7	29.8	39	20	29.5	S.	2	0	60-04	63 05	Clear. Passed several icebergs
" 30	29.7	29.45	29.57	30	26	28	N.	8	0	56-13	58-23	Fine and clear.
" 31	29.75	29.35	29.55	37	28	32.5	NW.	8	0	52-00	55-43	Clear.
Nov. 1	29.6	29.1	29.35	32	29	30.5	SW.	10	10	48-43	59-30	Blizzard with sleet.
" 2	29.9	29.3	29.6	33	21	27	NW.	10	10	48-40	60-03	Blizzard with snow.
" 3	30.2	29.9	30.05	40	30	35	NW.	4	0	45-19	60-55	Canso, N.S.
" 4	30.1	29.65	29.87	57	35	46	SW.	3	2	44-00	59-20	Off Sable Island.
" 5	29.75	29.62	29.68	39	32	35.5	N.	8	5	44-39	63-35	Arrived at Halifax, noon. Very stormy during the night, but a clear day.



HUDSON BAY

18 Aug 1913

19 Aug 1913

20 Aug 1913

HUDSON BAY AND STRAIT

Showing the path followed and the ice encountered by the U.S.S. Albatross during her trip to Port Nelson

1913

Captain E. Anderson

Commanding Officer

U.S.S. Albatross

Honorable J. D. H. Minister of the Naval Service of Canada

General Deputy Minister

Explanation of Signs

Ships track

Light ice

Heavy ice



Explanation of Symbols

Suspension

Light

Harbour

HUDSON BAY AND STRAIT

Showing the path followed by the USS Acadia
during her return trip from Port Nelson
1913

Captain J. Anderson
Officer in command
under the orders of

Honourable J. D. Hazen Minister of the Naval Service of Canada

G. J. Desbarats Deputy Minister

APPENDIX II.

WATER LEVELS OF THE "GREAT LAKES" FOR 1913, reduced to United States Standard datum or Mean Sea-level at New York.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Mean.
	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.
Lake Superior.					5th 602.10	602.38	602.57	602.69	602.78	602.92	602.77	602.67	602.61
Port Arthur.....												15th	
Above locks.	601.24	601.04	600.80	601.00	601.51	601.87	602.17	602.36	602.17	602.42	602.31	602.16	601.75
St. Mary's River.													
Below locks.	581.51	582.22	582.19	581.97	581.99	582.21	582.42	582.50	582.34	582.18	581.96	581.70	582.10
Lake Huron.					8th. 580.99	581.15	581.27	581.14	580.81	580.67	580.48	580.39	580.86
												26th.	
Isle Aux Peches.....	574.80	574.14	574.06	575.95	575.93	575.92	575.85	575.85	575.24	574.93	574.74	574.56	575.15
Detroit River.			12 dys										
Fighting Island....	574.16	573.87	573.98	575.38	575.43	575.39	575.28	575.05	574.47	574.30	574.07	573.87	574.60
Lake Erie.													
Port Collborne	572.31	572.56	572.25	573.65	573.63	573.57	573.42	572.97	572.50	572.31	572.24	572.16	572.80
Port Dalhousie					9th. 247.97	248.01	247.76	247.32	246.76	246.24	246.07	245.93	247.01
Lake Ontario.													
Kingston.....	246.35	46.572	246.55	247.58	247.87	247.95	247.77	247.25	246.65	246.18	246.04	245.83	246.88

APPENDIX III.

DESCRIPTIONS OF BENCH-MARKS Established by Automatic Gauges, and Elevations
Determined by Water Transfers.

Location.	Description.	Mean Elevation.
	<i>Lake Superior.</i>	Feet.
Port Arthur, Ontario.	Port Arthur Bench-mark is the top of a steel rivet set vertically into foundation stone, first course above ground, situated at SW. corner of C.P.R. freight office on Arthur Street, Trans. 1907-13 (inc.).....	616·15
	<i>Lake Huron.</i>	
Goderich, Ontario.	Goderich Bench-mark is top of steel rivet set vertically in cement foundation SE. corner of chimney of Goderich Water Works pump-house; south side of harbour, Trans. 1910-13 (inc.).....	588·574
	<i>Georgian Bay.</i>	
Collingwood, Ontario.	Collingwood Bench-mark No. 668½ is top of a steel rivet set vertically in top of plinth course NW. corner of Collingwood Ship Building Co.'s pump-house, Trans. 1906-11 (inc.).....	587·852
French River, Ontario.	French River Bench-mark No. 26 is top of iron ring-bolt set in solid rock about 250 feet SW. of Ontario Lumber Co's wharf, Trans. 1906-07 (inc.).....	591·585
	<i>Lake Erie.</i>	
Port Colborne, Ontario.	Port Colborne Bench-mark is top of a steel rivet set vertically in coping, N. side of W. abutment of Swing Bridge over S. entrance walls to guard lock of Welland canal, Trans. 1911-13 (inc.).....	584·680
Port Stanley, Ontario.	Port Stanley Bench-mark is top of steel rivet set vertically in top course of stone abutment on the N. side and at E. end of steel bridge over Kettle creek, Trans. 1908-11 (inc.).....	586·998
	<i>Lake Ontario.</i>	
Kingston, Ontario.	Kingston Bench-mark is top of steel rivet set vertically in top plinth course SW. corner of pump-house at Kingston Dry Dock, Trans. 1909-13 (inc.).....	252·721
Brighton, Ontario.	Brighton Bench-mark is top of steel rivet set vertically in a bastard marble rock about 1,000 feet NW. of Brighton wharf, and about 400 feet from the shore; Letters B.M. cut in rock, Trans. 1908-09 (inc.)..	256·572
Toronto, Ontario.	Toronto Bench-mark No. 646½ is top of steel rivet set vertically in top of coping stone on SE. corner of large arched portal of Garrison Creek sewer about 800 feet N. of W. end of Queen's wharf, Trans. 1906-09 (inc.).....	254·210

Elevations refer to United States standard datum or mean sea-level at New York.

APPENDIX IV.
BENCH-MARKS Established by Automatic Gauges, and Elevations Determined by Water Transfer.

Year.	LAKE ONTARIO.			LAKE ERIE.		LAKE HURON.		GEORGIAN BAY.		LAKE SUPERIOR	
	Brighton B.M. MCXCVIII.	Toronto B.M. No. 646½.	Port Stanley B.M.	Port Colborne B.M.	Goderich B.M.	Collingwood B.M. No. 668½.	French River B.M. Peter's No. 26.	Port Arthur B.M.			
	Trans. from Tibbett's Pte.			Cleve- land.	Buffalo.	Cleve- land.	Harbour Beach.	Mack- inaw.	Harbour Beach.	Mack- inaw.	Mar- quette.
1906											
1907											
1908											
1909											
1910											
1911											
1912											
1913											
Mean											

Elevations refer to United States standard datum or mean sea-level at New York.

APPENDIX V.

COMPARISONS of Canadian and United States Water Surface Elevations of Great Lakes,
1906-13.

LAKE SUPERIOR.

Year.	Period of Occupation.	MEAN DURING PERIOD OF OPERATION.		Ports of Comparison.
		Canadian.	U. States.	
		Feet.	Feet.	
1907.....	June 16—Nov. 13, inc.....	602·92	602·93	Port Arthur, and Marquette, Mich.
1908.....	May 25—Nov. 7 “	602·61	602·63	
1909.....	May 8—Nov. 92 “	602·16	602·16	
1910.....	Apr. 12—Nov. 11 “	601·85	601·86	
1911.....	May 12—Nov. 7 “	601·76	601·76	
1912.....	May 6—Nov. 26 “	602·34	602·39	
1913.....	May 5—Dec. 15 “	602·61	602·68	
Mean during operation.....		602·32	602·34	

LAKE HURON.

1906.....	May 17—Nov. 27 inc.....	581·15	581·14	Collingwood and Harbour Beach, Mich.
1907.....	May 22—Nov. 28 “	581·30	581·31	
1908.....	May 23—Oct. 31 “	581·43	581·43	
1909.....	May 1—Nov. 22 “	580·76	580·76	
1910.....	Apr. 11—Nov. 21 “	580·24	580·25	
1911.....	May 20—Nov. 17 “	579·75	579·73	
1906.....	July 1—Nov. 17 “	581·10	581·10	Collingwood and Mackinaw, Mich.
1907.....	May 22—Nov. 28 “	581·30	581·29	
1908.....	May 23—Oct. 31 “	581·43	581·48	
1909.....	May 1—Nov. 22 “	580·76	580·71	
1910.....	Apr. 11—Nov. 21 “	580·34	580·21	
1911.....	May 20—Nov. 17 “	579·75	579·74	
1906.....	Sept. 1—Nov. 21 “	580·82	580·88	French River and Harbour Beach, Mich
1907.....	May 14—Nov. 28 “	581·30	581·31	
1906.....	Sept. 1—Nov. 21 “	580·82	580·88	French River and Mackinaw, Mich.
1907.....	May 14—Nov. 28 “	581·30	581·29	
1910.....	May 28—Nov. 17 “	580·30	580·24	Goderich and Harbour Beach, Mich.
1911.....	May 23—Nov. 15 “	579·74	579·74	
1912.....	May 11—Dec. 15 “	580·38	580·43	
1913.....	May 8—Dec. 26 “	580·86	580·89	
1910... ..	May 28—Nov. 17 “	580·30	580·24	Goderich and Mackinaw, Mich.
1911.....	May 23—Nov. 15 “	579·74	579·74	
1912.....	May 11—Dec. 15 “	580·38	580·43	
1913.....	May 11—Dec. 24 “	580·86	580·88	
Mean during operation.....		580·67	580·67	

Elevations refer to United States standard or mean sea-level at New York.

SESSIONAL PAPER No. 38

COMPARISONS of Canadian and United States Water Surface Elevations of Great Lakes,
1906-13—*Concluded.*

LAKE ERIE.

Year.	Period of Operation.	MEAN DURING PERIOD OF OPERATION.		Ports of Comparison.
		Canadian.	U. States.	
		Feet.	Feet.	
1911.....	Aug. 1—Dec. 31 inc..	571.52	571.52	Port Colborne and Buffalo, N.Y.
1912.....	Jan. 1—Dec. 31 “	571.85	572.04	
1913.....	Jan. 1—Dec. 31 “	572.80	572.86	
1911.....	Aug. 1—Dec. 31 “	571.52	571.44	Port Colborne and Cleveland, Ohio.
1912.....	Jan. 1—Dec. 31 “	571.85	572.02	
1913.....	Jan. 1—Dec. 31 “	572.80	572.95	
1908.....	July 6—Nov. 12 “	572.67	572.66	Port Stanley and Cleveland, Ohio.
1909.....	Apr. 17—Nov. 10 “	572.49	572.49	
1910.....	Apr. 9—Sept. 30 “	572.33	572.27	
1911.....	May 19—Nov. 10 “	571.66	571.65	
Mean during operation.		572.15	572.19	

LAKE ONTARIO.

1907.....	June 1—Nov. 30 inc..	246.55	246.56	Toronto and Tibbett's Pte., N.Y.
1908.....	May 15—Nov. 15 “	247.45	247.69	
1909.....	April 14—Nov. 21 “	246.33	246.32	
1908.....	May 13—Nov. 17 “	247.56	247.69	Brighton and Tibbett's Pte., N.Y.
1909.....	April 13—Nov. 23 “	246.34	246.32	
1909.....	April 11—Dec. 30 “	246.22	246.19	Kingston and Tibbett's Pte., N.Y.
1910.....	April 5—Dec. 31 “	245.78	245.77	
1911.....	Jan. 1—Dec. 31 “	244.97	244.96	
1912.....	Jan. 1—Dec. 31 “	246.03	245.99	
1913.....	Jan. 1—Dec. 31 “	246.88	246.88	
1910.....	May 21—Nov. 20 “	245.91	245.90	Port Dalhousie and Tibbett's Pte. N.Y.
1911.....	May 19—Nov. 16 “	245.08	245.02	
1912.....	May 11—Nov. 17 “	246.58	246.52	
1913.....	May 9—Dec. 27 “	247.01	246.91	
Mean during operation.		246.33	246.34	

Elevations refer to United States standard datum or mean sea-level at New York.

APPENDIX VI.

DAILY MEAN ELEVATIONS of Lower St. Lawrence at Montreal, Que., Year 1913.
Elevations refer to mean sea-level at New York, which is 6.13 above Steckel's datum.

Days.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.
1		25.31	22.76	21.99	21.46	20.95		
2		25.32	22.85	22.02	21.51	21.39		22.08
3		25.18	22.83	22.00	21.53	21.48		22.08
4		25.15	22.73	22.22	21.67	21.39		22.08
5		24.92	22.75	22.12	21.49	21.18		22.09
6		24.74	22.63*	22.01	21.29	21.08		22.10
7		24.76*	22.72	22.04	21.12	20.99		
8		24.65	22.80	21.89	21.21*	20.83		
9		24.53	22.69	21.72	21.26	20.72		
10		24.28	22.76	21.81*	21.06	20.72		
11		24.07	22.72	21.79	20.97	20.50		
12		24.28*	22.56	21.65	20.94			
13		24.13	22.40	21.56	20.93			
14		24.16	22.43*	21.57	20.90			
15		23.97*	22.58*	21.52	20.89			
16		23.91	22.55	21.47	20.89			
17		24.02	22.49	21.51	20.83	20.86		
18		23.93*	22.51	21.64	21.12	20.76		
19		23.78	22.53	21.68	21.10	20.72		
20		23.69*	22.51	21.45	20.96	21.15		
21		23.70	22.54	21.29	20.78	20.67		
22		23.59	22.45	21.19	20.98	20.97		
23		23.53	22.39	21.29	21.01	20.95		
24		23.47	22.37	21.33	20.96	21.11		
25		23.53*	22.39	21.37	20.86	21.45		
26		23.36	22.17	21.31	20.80	22.05		
27		23.27	22.05	21.41*	20.89	21.87		
28		23.24	22.06	21.45	20.72	22.01		
29	25.59	23.03	22.13	21.31	20.82	22.13		
30	25.56	22.82	22.14	21.33	21.04	22.44		
31	25.55		22.14	21.39		22.37		
Mean.....	25.57	24.08	22.50	21.62	21.07	21.26		

APPENDIX VII.

DAILY MEAN ELEVATIONS of Lower St. Lawrence at Longue Pointe, Que., Year 1913.
Elevations refer to mean sea-level at New York, which is 6.13 above Steckel's datum.

Days.	May	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.
1.	25.41	23.20	20.55	19.84	19.34	19.82	20.05	20.22
2.	25.43	23.17	20.61	19.87	19.40	19.42*	20.08	20.30
3.	25.62	23.02	20.60	19.86	19.43	19.51	19.95	20.29
4.	25.68	23.04	20.52	20.07	19.59	19.43	19.86	20.23
5.	25.64	22.81	20.55	19.99	19.45	19.22	19.81	20.25
6.	25.71	22.63	20.45	19.88	19.27	19.09	19.51	20.32*
7.	25.94	22.64	20.52	19.92	19.09	18.96	19.42	
8.	25.85	22.56	20.61	19.78	19.10	18.79	19.32	
9.	25.71	22.41	20.52	19.60	19.15	18.66	19.44	
10.	25.71	22.15	20.57	19.70	18.96	18.64	19.33	
11.	25.47	21.88	20.54	19.64	18.87	18.45	19.57	
12.	25.19	22.10	20.40	19.50	18.83	18.47	19.81	
13.	25.00	21.93	20.23	19.41	18.83	18.60	19.82	
14.	24.81	21.95	20.25	19.42	18.81	18.78	19.87	
15.	24.51	21.82	20.37	19.37	18.78	18.90	19.88	
16.	24.27	21.69	20.38	19.33	18.79	18.97	19.82	
17.	24.08	21.81	20.33	19.38	18.75	18.88	19.70	
18.	23.76	21.73	20.36	19.48	19.01	18.82	19.73	
19.	23.79	21.60	20.41	19.55	19.02	18.74	19.92	
20.	23.75	21.51	20.40	19.38	18.90	19.24	20.12*	
21.	23.60	21.53	20.40	19.23	18.76	18.64	20.28	
22.	23.52	21.43	20.32	19.11	18.91	18.98	20.24	
23.	23.51	21.34	20.24	19.18	18.90	18.98	20.07	
24.	23.46	21.27	20.21	19.21	18.83	19.09	20.29	
25.	23.32	21.37	20.22	19.23	18.73	19.50*	20.38	
26.	23.17	21.17	20.01	19.18*	18.70	20.12	20.44	
27.	22.99	21.07	19.89	19.26*	18.77	19.97	20.53	
28.	22.98	21.02	19.87	19.28	18.60	20.12	20.45	
29.	23.33	20.81	19.94	19.17	18.70	20.22	20.34	
30.	23.42	20.61	19.94	19.19	18.95	20.53	20.31	
31.	23.42		19.97	19.28		20.47		
Mean.....	24.45	21.91	20.33	19.49	18.97	19.20	19.94	20.27

Daily means marked thus * are incomplete.

APPENDIX VIII.

DAILY MEAN ELEVATIONS of Lower St. Lawrence at Varennes, Que., Year 1913.
Elevations refer to mean sea-level at New York, which is 6.13 above Steckel's datum.

Days.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.
1		22.03	19.16	18.38*	17.88	17.52	18.77	19.00
2		21.98	19.22	18.42	17.95	18.01	18.77	19.03
3		21.82	19.21	18.44	18.00	18.20	18.64	19.00
4		21.84	19.12	18.66	18.18	18.13	18.50	18.93
5		21.61	19.19	18.59	18.06	17.89	18.44	18.94
6		21.43	19.09*	18.47*	17.88	17.70	18.12	18.99*
7		21.41	19.15	18.51*	17.67	17.54	18.04	
8		21.34	19.26	18.38	17.62	17.33	17.96	
9	24.68*	21.17	19.18	18.16*	17.65	17.17	18.09	
10	24.62	20.90	19.19*		17.47	17.16	18.02	
11	24.41	20.59	19.16		17.38	16.99	18.20	
12	24.10	20.81	19.04	17.98*	17.35	16.96	18.40	
13	23.80	20.63	18.81*	17.93	17.32	17.09	18.46	
14	23.66	20.65	18.80	17.93	17.30	17.28	18.51	
15	23.37	20.52	18.92*	17.88	17.28	17.48	18.54	
16	23.12	20.39		17.82*	17.29	17.59	18.50	
17	22.95	20.49		17.91	17.25	17.52	18.36	
18	22.62	20.42		18.02	17.52	17.49	18.37	
19	22.61	20.29		18.10	17.57	17.36	18.58	
20	22.56	20.22		17.92*	17.48	17.96	18.81	
21	22.42	20.24		17.78	17.36	17.23	18.94	
22	22.38	20.13		17.64	17.46	17.55	18.92	
23	22.37	20.03		17.65	17.40	17.54*	18.73	
24	22.28*	19.95		17.68	17.34	17.68	18.94	
25	22.13	20.06		17.67	17.24	18.02	19.04	
26	21.97	19.85		17.64	17.14	18.82	19.11	
27	21.79	19.72		17.71	17.24	18.71	19.24*	
28	21.77	19.66	18.45	17.76	17.31*	18.88	19.23	
29	22.09	19.45	18.44	17.68	17.21*	18.98	19.13	
30	22.22	19.21	18.45*	17.68	17.47	19.30	19.12*	
31	22.24		18.49	17.80		19.22*		
Mean.....	22.88	20.63	18.96	18.01	17.51	17.82	18.62	18.98

Daily'means marked thus * are incomplete.

APPENDIX IX.

DAILY MEAN ELEVATIONS of Lower St. Lawrence at Verchères, Que., Year 1913.
Elevations refer to mean sea-level at New York, which is 6.13 above Steckel's datum.

Days.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.
1		20.46	17.47	16.73	16.28	16.00	17.24	17.41
2		20.39	17.52	16.78	16.38	16.46	17.21	17.42
3		20.23	17.52	16.84	16.44	16.69*	17.05	17.37
4		20.27	17.45	17.07	16.62	16.66	16.88	17.27
5		20.07	17.56	17.00	16.50	16.42	16.81	17.29
6		19.89	17.51	16.89	16.35	16.18	16.45	
7		19.87	17.53	16.92	16.12	15.97	16.34	
8		19.80	17.64	16.79	16.02	15.77	16.29	
9		19.62	17.59	16.56	16.05	15.59	16.46	
10		19.34	17.58	16.59	15.85	15.58	16.47	
11		18.99	17.54	16.51	15.79	15.48	16.56	
12		19.20	17.40	16.39	15.75	15.42	16.72	
13		19.02	17.15	16.31	15.72	15.55	16.82	
14		19.02	17.11	16.31	15.70	15.78	16.87	
15	21.69*	18.92	17.27	16.26	15.69	16.01	16.92	
16	21.53	18.76	17.32	16.20	15.69	16.16	16.89	
17	21.40	18.86	17.30	16.30	15.68	16.08	16.72	
18	21.09	18.81	17.35	16.41	15.93	16.10	16.71	
19	21.04	18.70	17.41	16.50	15.99	15.93	16.93	
20	20.98	18.61	17.42	16.36	15.94	16.54	17.15	
21	20.86	18.63	17.41	16.19	15.86	15.77	17.27	
22	20.83	18.52	17.30	16.04	15.91	15.96	17.27	
23	20.80	18.39	17.21	16.06	15.82	16.03	17.08	
24	20.74	18.29	17.14	16.07	15.73	16.05	17.28	
25	20.57	18.40	17.15	16.03	15.65	16.36	17.39	
26	20.37	18.21	16.91	16.01	15.55	17.18	17.48	
27	20.19	18.05	16.77	16.08	15.64	17.14	17.65	
28	20.14	17.98	16.72	17.13	15.50	17.33	17.71	
29	20.44	17.76	16.77	16.08	15.55	17.45	17.59	
30	20.59	17.53	16.79	16.08	15.92	17.77	17.56	
31	20.65		16.83	16.18	....	17.73		
Mean.	20.82	19.02	17.28	16.41	15.92	16.29	16.99	17.35

Means marked thus * are incomplete.

APPENDIX X.

DAILY MEAN ELEVATIONS of Lower St. Lawrence at Lanoraie, Que., Year 1913.
Elevations refer to mean sea-level at New York, which is 6.13 above Steckel's datum.

Days.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.
1.....		18.62	15.53	14.86	14.47		15.48	15.62
2.....		18.51	15.57	14.92	14.58		15.38	15.58
3.....		18.36	15.59	15.02	15.66		15.23	15.47*
4.....		18.41	15.54	15.24	14.85	15.02	15.01	
5.....		18.25	15.68	15.24	14.77	14.80	14.89	
6.....		18.09	15.70	15.13	14.60	14.46	14.51	
7.....		18.01	15.71	15.14	14.36	14.18	14.41	
8.....		17.97	15.79	15.03	14.15	13.90	14.40	
9.....		17.76	15.77	14.76	14.12	13.69	14.58	
10.....		17.46	15.74	14.70	13.94	13.66	14.67	
11.....		17.10	15.66	14.60	13.84	13.62	14.65	
12.....		17.25	15.54	14.48	13.84	13.55	14.73	
13.....		17.08	15.30*	14.39	13.82	13.64	14.90	
14.....		17.05	15.24	14.39	13.80	13.88	14.99	
15.....		16.97	15.40	14.36	13.81	14.20	15.06	
16.....		16.84	15.47	14.32	13.81	14.44	15.07	
17.....		16.88	15.48	14.46	13.82	14.40	14.92	
18.....	19.11*	16.88	15.55	14.56	14.05	14.47	14.81	
19.....	19.13	15.79	15.62	14.64	14.17	14.26	15.00	
20.....	19.06	16.69	15.64	14.51	14.13	14.73	15.22	
21.....	18.95	16.71	15.61	14.38	14.09		15.31	
22.....	18.94	16.58	15.49	14.26	14.12	14.05*	15.34	
23.....	18.92	16.45	15.37	14.21	13.98	14.13	15.12	
24.....	18.87	16.33	15.27	14.13	13.83	14.13	15.35	
25.....	18.70	16.43	15.24	14.03	13.71	14.38	15.47	
26.....	18.49	16.25	15.01	14.03	13.65	15.20	15.59	
27.....	18.28	16.09	14.83	14.10	13.70	15.35	15.87	
28.....	18.18	15.98	14.77	14.14	13.63	15.56	15.96	
29.....	18.42	15.76	14.77	14.17	13.57	15.73	15.85	
30.....	18.62	15.56	14.80	14.21	13.90	16.04	15.80	
31.....	18.72		14.88	14.36		16.04		
Mean.....	18.74	17.10	15.41	14.54	14.06	14.50	15.12	15.56

Means marked thus * are incomplete.

APPENDIX XI.

DAILY MEAN ELEVATIONS of Lower St. Lawrence at Sorel, Que., Year 1913.
Elevations refer to mean sea-level at New York, which is 6.13 above Steckel's datum.

Days.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.
1.....		20.87	18.16	15.15	14.49	14.17	14.00	15.15	15.24
2.....		20.82	18.05	15.20	14.58	14.30	14.47	15.03	15.25*
3.....		20.84*	17.91	15.23	14.69	14.38	14.84	14.89	
4.....		20.85	17.96	15.19	14.89	14.54	14.79	14.67	
5.....		20.78	17.82*	15.32	14.91	14.47	14.49	14.51	
6.....		20.76	17.67	15.40	14.81	14.32	14.19	14.15	
7.....		20.85	17.60	15.36	14.79	14.08	13.90	14.02	
8.....		20.84	17.55	15.42	14.69	13.85	13.61	14.02	
9.....		20.72	17.35	15.39	14.43	13.79	13.38	14.20	
10.....		20.63*	17.05	15.37	14.33	13.63	13.36	14.36	
11.....		20.46	16.70	15.28	14.24	13.55	13.38	14.29	
12.....		20.16	16.81	15.17	14.13	13.53*	13.29	14.34	
13.....		19.82	16.66	14.95	14.03	13.51	13.38	14.51	
14.....		19.55	16.61	14.88	14.03	13.51	13.61	14.61	
15.....		19.28	16.53	15.03	14.02	13.52	13.95	14.69	
16.....		19.05	16.43	15.11	14.00	13.50	14.19	14.70*	
17.....		18.96	16.46	15.12	14.12	13.52	14.16	14.54	
18.....		18.74	16.46	15.19	14.23	13.74	14.23	14.44	
19.....		18.63	16.38	15.26	14.30	13.86	14.04	14.63	
20.....		18.54	16.30	15.29	14.18	13.84	14.56	14.83	
21.....		18.43	16.32	15.25	14.06	13.81	13.86	14.91	
22.....		18.44	16.19	15.14	13.93	13.84	13.74	14.93	
23.....		18.44*	16.05	15.01	13.89	13.69	13.80	14.71	
24.....		18.39	15.92	14.90	13.82	13.52	13.80	14.93	
25.....		18.22	16.01	14.87	13.70	13.41	14.01	15.05	
26.....	19.94*	18.01	15.83	14.66	13.68	13.34*	14.83	15.19	
27.....	20.07	17.79	15.66	14.45	13.73		14.99	15.49	
28.....	20.33	17.68	15.56	14.39	13.79	13.28*	15.19	15.58	
29.....	20.73	17.89	15.36	14.40	13.82	13.36	15.39	15.47	
30.....	20.84	18.12	15.17	14.42	13.90	13.78	15.70*	15.42	
31.....		18.24		14.49	14.04		15.64*		
Mean.....	20.38	19.38	16.68	15.04	14.20	13.78	14.22	14.74	15.25

ANNUAL REPORT OF RADIOTELEGRAPH BRANCH, 1913-14.

June 15, 1914.

The Deputy Minister,
Department of the Naval Service,
Ottawa.

SIR,—I have the honour to present herewith the annual report of the Radiotelegraph Branch for the fiscal year ended March 31, 1914.

There has been an increase of forty-six in the number of radiotelegraph stations established in Canada and on Canadian ships during the year, as follows:—

Government commercial stations.....	1
Coast stations	5
Government ship stations	5
Licensed ship stations	14
Licensed commercial stations	2
Licensed amateur and experimental stations.....	19

The total number of stations now in operation is as follows:—

	1912-13.	1913-14.	Increase.
Government commercial stations		1	1
Coast Stations.....	37	42	5
Government ship stations.....	16	21	5
Licensed ship stations.....	36	50	14
Licensed commercial stations.....	6	8	2
Licensed amateur and experimental stations.....	28	47	19
	123	169	46

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The following list shows the location of the land and coast stations in operation in Canada, their ranges, call signals, and by whom they are owned and operated:—

COAST STATIONS for Communication with Ships

Name.	Where Situated.	Owned by.	Operated by.	Range in nautical miles.	Call Signal.
<i>East Coast.</i>					
Belle Isle, Nfld.....—	Belle Isle Straits.	Dominion Government	Marconi Wireless Tel. Co. of Canada.	250	VCM
Pt. Amour, Nfld.....—	" "	"	"	150	VCL
Pt. Riche, Nfld.....—	Gulf of St. Lawrence..	"	"	250	VCH
Harrington, P.Q.....	" "	"	"	150	VCJ
Heath Pt., P.Q.....	Gulf of St. Lawrence (Anticosti Isld.).....	"	"	250	VCI
Cape Ray, Nfld.....	Cabot Straits.....	"	"	350	VCR
Cape Race, Nfld.....	North Atlantic.....	"	"	400	VCE
Grindstone Island, P.Q.....	Gulf of St. Lawrence (Magdalen Isld.)..	"	"	200	VCN
Fame Pt., P.Q.....	Gulf of St. Lawrence..	"	"	250	VCG
Clarke City, P.Q.....	" "	"	"	250	VCK
Father Pt., P.Q.....	River St. Lawrence...	"	"	250	VCF
Grosse Isle, P.Q.....	" "	"	"	100	VCD
Quebec, P.Q.....	" "	"	"	150	VCC
Three Rivers, P.Q.....	" "	"	"	150	VCB
Montreal, P.Q.....	" "	"	"	200	VCA
Cape Sable, N.S.....	North Atlantic.....	"	"	250	VCU
Partridge Isld., St. John, N.B.	Entrance St. John Harbour., N.B.	"	"	250	VCV
Cape Bear, P.E.I.....	Northumberland Strait.	"	"	150	VCP
Pictou, N.S.....	" "	Marconi Wireless Tel. Co. of Canada.	"	100	VCQ
North Sydney, C.B.....	North Sydney, C.B.....	"	"	100	VCO
Camperdown, N.S.....	Entrance to Halifax Harbour.	"	"	250	VCS
Sable Island, N.S.....	North Atlantic.....	"	"	300	VCT
Halifax, N.S.....	Halifax Dockyard.....	Dominion Government	Department of The Naval Service.	100	VAA
<i>Great Lakes.</i>					
Port Arthur, Ont.....	Port Arthur, Ont.....	"	Marconi Wireless Tel. Co. of Canada.	350	VBA
Sault Ste. Marie, Ont.....	Sault Ste. Marie, Ont...	"	"	350	VBB
Tobermory, Ont.....	Entrance Georgian Bay.	"	"	350	VBD
Midland, Ont.....	Georgian Bay.....	"	"	350	VBC
Point Edward, Ont.....	Lake Huron.....	"	"	350	VBE
Port Burwell, Ont.....	Lake Erie.....	"	"	350	VBF
Toronto, Ont.....	Toronto Island, Ont.....	"	"	350	VBG
Kingston, Ont.....	Barriefield Common...	"	"	350	VBH
<i>West Coast.</i>					
Gonzales Hill, B.C. (Victoria).	Victoria, B.C.	"	Department of Naval Service.	250	VAK
Pt. Grey, B.C., (Vancouver).	Entrance Vancouver Harbour.	"	"	150	VAB
Cape Lazo, B.C.....	Strait Georgia, near Comox, B.C.	"	"	350	VAC
Pachena Pt., B.C.....	West Coast Vancouver Isld.	"	"	500	VAD
Estevan Pt., B.C.....	" "	"	"	500	VAE
Triangle Isld., B.C.....	South of Hecate Str...	"	"	450	VAG
Ikeda Head, B.C.....	South of Moresby Island, Q.C.I.	"	"	250	VAI

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COAST STATIONS for Communication with Ships—*Concluded.*

Name.	Where Situated.	Owned by.	Operated by.	Range in nautical miles.	Call Signal.
<i>West Coast.</i>					
Dead Tree Pt., B.C.....	South of Graham Isld., Q.C.I.	" ..	" ..	200	VAH
Digby Island, B.C., Prince Rupert.	Digby Isld., Entrance Prince Rupert Har.	" ..	" ..	250	VAJ
Alert Bay, B.C.....	Cormorant Isld., B.C...	" ..	" ..	350	VAF
<i>Hudson Bay.</i>					
Port Nelson.....	Hudson Bay.....	" ..	" ..	750	VCN
Le Pas, Man.....	For communication with Port Nelson only.	" ..	" ..	750	VBM

LICENSED Commercial Stations.

Name.	Where Situated.	Owned by.	Operated by.	Range in nautical miles.	Call Signal.
Glace Bay, C.B.....	Near Glace Bay, C.B...	Marconi Wire- less Tel. Co. Canada.	Marconi Wire- less Tel. Co. Canada.	3,000	GB
Louisburg, C.B.....	Cape Breton.....	" ..	" ..	Reception only.	
Bowen Island, B.C.....	Bowen Island, B.C.....	Canadian.....	" ..	30	CB
Ocean Falls, B.C.....	Strait of Georgia.....	Explosives Co	Owners.....		CT
	Ocean Falls, B.C.....	Ocean Falls, Co.	" ..	150	
Powell River, B.C.....	Powell River, B.C....	Powell River Co.	" ..	30	CH
Toronto, Ont.....	Toronto, Ont.....	Goodyear Tyre and Rubber Co.	" ..	50	CC
Bowmanville, Ont.....	Bowmanville, Ont.....	" ..	" ..	50	CF
Toronto, Ont.....	Toronto, Ont.....	J. C. Eaton...	" ..	300	CA

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LICENSED Experimental and Amateur Stations.

Name.	Address.	Call Signal.
Cuthbert, David.....	Bamfield, B.C.....	Reception only.
O'Hanley, Chas. John.....	Yarmouth, N.S.....	XAK
Fowler, W. D.....	Montreal, P.Q.....	XAM
Barnes, George H.....	Meighs Corners, P.Q.....	XAS
Gray, Wm. H.....	North Vancouver, B.C.....	XAV
Hum, Jack Oak.....	St. John, N.B.....	XBB
Jackson, W. F.....	Victoria, B.C.....	XAZ
Jeune, H. H.....	Victoria, B.C.....	XAW
McCall, James D.....	Montreal, P.Q.....	XBD
Rogers, K. S.....	Charlottetown, P.E.I.....	XAR
Thompson, Trevor C.....	Montreal, P.Q.....	XBE
Stewart, A. T.....	Victoria, B.C.....	XBH
Pierce, W. A.....	Victoria, B.C.....	XAY
Marshall, E.....	Vancouver, B.C.....	XBI
Restall, B. A. B.....	Victoria, B.C.....	XBJ
Barnsley, Jack.....	Victoria, B.C.....	XBK
Kirby, K. C.....	Victoria, B.C.....	XBL
Gosnell, G. D.....	Victoria, B.C.....	XBM
Natalic, Brother.....	Three Rivers, P.Q.....	XBN
Allen, Creagh.....	Victoria, B.C.....	XBO
Robitaille, H. G.....	Verdun, Montreal, P.Q.....	XBP
Langley, A. R.....	Victoria, B.C.....	Reception only.
Elliot, S.....	Victoria, B.C.....	XBQ
Marshall, A. L.....	Victoria, B.C.....	Reception only
Telmosse, J. G.....	Shawinigan Falls, P.Q.....	"
Renouf, R. J.....	Victoria, B.C.....	XBR
Logan, C. P.....	St. John, N.B.....	XBS
Ecole Polytechnique.....	Montreal, P.Q.....	XBT
Phelps, F. W.....	Chatham, Ont.....	XBU
Gray, J. R.....	Victoria, B.C.....	XBV
Giroux, A. W.....	Montreal, P.Q.....	XBW
Scott, J. B.....	Montreal, P.Q.....	XBX
Navaret, Brother.....	Hull, P.Q.....	XBY
Murphy, N.....	Three Rivers, P.Q.....	XBZ
Crowell, G. D.....	Sydney, N.S.....	XCA
Johns, Clarence.....	Victoria, B.C.....	XCB
Vaughan, H. P.....	Montreal, P.Q.....	XCC
Folger, H. P.....	Kingston, Ont.....	XCD
Sylvestre, A. L.....	Montreal, P.Q.....	XCE
Meerbergen, Gabriel.....	Shawinigan Falls, P.Q.....	XCF
Beique, H. A.....	Shawinigan Falls, P.Q.....	XCG
Darling, C.....	Westmount, Montreal..	XCH
Tuckett, C. P.....	Guelph, Ont.....	XCI
Reading, H.....	Halifax, N.S.....	XCJ
Owens, W. Earl.....	Westmount, Montreal..	XCK
Thomas, G. D.....	Toronto, Ont.....	XCL
Thomas, A. M.....	Toronto, Ont.....	XCM

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The following list shows the vessels of Canadian register which are equipped with radiotelegraph apparatus, their call signal and by whom they are owned and operated:—

LICENSED SHIP STATIONS.

Name of Ship.	Port of Registry.	Name of Owners.	Name of Company operating the Station.	Call Signal.
S.S. Assiniboia....	Montreal, P.Q.	Can. Pacific Railway.	Marconi Wireless Tel. Co. of Can.	VGI
" Alberta.....	"	"	"	VFQ
" Athabaska.....	"	"	"	VGG
" Manitoba.....	"	"	"	VGH
" Keewatin.....	"	"	"	VGC
" Boston.....	Yarmouth, N.S.....	"	"	VFS
" Hamonic.....	Collingwood, Ont.	Northern Nav. Co....	"	VGD
" Huronic.....	"	"	"	VGE
" Province..	Port Arthur, Ont.....	Great Lakes Towing & Wrecking Company.....	"	VFR
" Empire.....	"	"	"	VFP
" Salvor.....	Victoria, B.C....	B.C. Salvage Co.....	Owners.	VFV
" Prince Rupert..	Newcastle, C.B.....	Grand Trunk Pac. Ry	"	GLS
" Prince George	"	"	"	GLR
" Prince Albert	Prince Rupert, B.C.	"	"	VFL
" Prince John.....	"	"	"	VFM
" Florence.....	Toronto, Ont.....	T. Eaton.....	Marconi Wireless Tel. Co. of Canada.	VFT
" Princess Beatrice.....	Victoria, B.C.....	Can. Pacific Railway.	"	VFC
" Princess Charlotte.....	"	"	"	VFE
" Princess May.....	Vancouver, B.C.....	"	"	VFH
" Prince Royal.....	Victoria, B.C.....	"	"	VFG
" Tees.....	"	"	"	VFK
" Camosun.....	Vancouver, B.C.....	Union Steamship Co.	Owners.....	VFZ
" Princess Adelaide.....	Victoria, B.C.....	Can. Pacific Railway.	Marconi Wireless Tel. Co. of Canada.....	VFA
" Princess Mary..	"	"	"	VFB
" Princess Alice.....	"	"	"	VFD
" Princess Ena.....	"	"	"	VFJ
" Princess Sophia.....	"	"	"	VFI
" Saronic.....	Sarnia, Ont....	Northern Nav. Co....	"	VGF
" Lord Strathcona.....	Quebec, P.Q....	Quebec Salvage Co....	"	VFX
" A. W. Perry.....	Halifax, N.S....	Plant Line.....	"	VFW
" Aranmore.....	Glasgow.....	Holliday Bros.....	"	VFY
" Royal Edward.....	Toronto, Ont.....	Northern Nav. Co....	"	VGB
" Royal George.....	"	"	"	VGA
S.Y. Aquilo.....	Vancouver, B.C.....	B. J. Rogers.....	Owners.....	VFU
S.S. St. Ignace.....	Port Arthur, Ont.....	Great Lakes Towing and Wrecking Co....	Marconi Wireless Tel. Co. of Canada.	VGL
" Chelohsin.....	Vancouver, B.C.....	Union Steamship Co..	Owners.....	VGN
" City of Sydney..	Montreal, P.Q..	The N.Y. Nfld. Halifax Shipping Co....	Marconi Wireless Tel. Co. of Canada.	VFO
" Morwenna.....	Montreal, P.Q..	"	"	VFN
" Prince Arthur.....	Yarmouth, N.S.	Boston and Yarmouth S.S. Co.	"	VGJ
" Prince George.	"	"	"	VGK
" Evangeline.....	Windsor, N.S....	Can. Atlantic & Plant Steamship Co.....	"	VGO
" Halifax.....	Halifax, N.S.....	"	"	VGP
" Robert Dollar.....	Victoria, B.C....	Dollar S.S. Lines.....	"	VGM
" Everett G. Griggs...	"	Everett G. Griggs Co.	Owners.....	VGQ
" Douglas H. Thomas.	Sydney, C.B.	Dom. Coal Co.....	Marconi Wireless Tel. Co. of Canada.....	VGR
S.Y. Solgar	Toronto, Ont.....	G. P. Grant.....	"	VGS
S.S. Princess Maquinna.....	Victoria, B.C.....	Can. Pacific Railway.	"	VGT
Car Ferry "Ontario No. 1"	Montreal, P.Q.....	Ont. Car Ferry Co....	Radio Elec. Co.....	VGU
S.S. Naronic.....	Port Arthur, Ont.....	Northern Nav. Co....	Marconi Wireless Tel. Co. of Can.....	VGW
" Seal..	Windsor, N.S.....	Halifax Trading & Sealing Co.	"	VGW

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GOVERNMENT STEAMERS EQUIPPED WITH RADIOTELEGRAPH INSTALLATIONS.

OPERATED by the Department of the Naval Service.

Name.	Range.	Call Signal.
H.M.C.S. <i>Niobe</i> ...	400 miles	VDA
" <i>Rainbow</i> ...	250 "	VDB
C. G. S. <i>Canada</i>	150 "	VDC
" <i>Acadia</i>	200 "	VDT
" <i>Malaspina</i>	200 "	VDU
" <i>Galiano</i>	200 "	VDV

OPERATED by the Department of Marine and Fisheries.

Name.	Range.	Call Signal.
C. G. S. <i>Minto</i>	150 miles.	VDD
" <i>Stanley</i>	150 "	VDE
" <i>Lady Laurier</i> ...	150 "	VDF
" <i>Aberdeen</i>	100 "	VDG
" <i>Druid</i>	100 "	VDH
" <i>Earl Grey</i>	200 "	VDI
" <i>Montcalm</i>	150 "	VDJ
" <i>Montmagny</i>	200 "	VDK
" <i>Lady Grey</i>	100 "	VDL
" <i>Quadra</i>	100 "	VDM
" <i>Estevan</i>	200 "	VDN
" <i>Dollard</i>	150 "	VDO
" <i>Newington</i>	100 "	VDP
" <i>Lurher Lightship</i>	100 "	VDR
" <i>Simcoe</i>	100 "	VDS

INSPECTION OF STATIONS.

All the land, coast, and ship stations situated in the Dominion or under its jurisdiction have been inspected at least once during the year. We have not, however, owing to our somewhat limited staff, been able to devote as much attention to the "amateur experimental" class of stations as is desirable. On the whole, these latter stations have reasonably observed the regulations issued for their control, but there still remain a large number of them in both Toronto and Montreal operated without a license, and complaints reach us from time to time that the Montreal coast station is being interfered with. We hope, during the coming year, to be in a position to inspect and license such stations, and to compel the strict observance of the regulations. It is possible drastic action may be necessary in certain cases, and a prosecution made. The publicity which would ensue from such procedure should have a very beneficial effect on the amateur situation generally, and show that the department is in earnest in its efforts to enforce the law.

Under the revised regulations, every possible facility, compatible with non-interference with the regular commercial and coast station service, is given the operation of amateur stations.

LICENSED TRANSATLANTIC STATION AT NEWCASTLE, N.B.

An interesting development of the year was the application by the Universal Radio Syndicate of London, Eng., for a license to install and operate a transatlantic

station at Newcastle, N.B. Work has been commenced on the station, which it is anticipated will be placed in commission about the end of May, 1914.

The station will operate on the Poulsen (arc) system of radiotelegraphy, and is intended to communicate with a similar station now in course of erection at Ballybunion, Ireland.

The power plant of the Newcastle station consists of two 225-horsepower Deisel engines directly connected to two D.C. generators. The aerial is of the umbrella type, covering approximately 20 acres, supported by six 400-foot wooden towers and one 500-foot steel tower.

Under the agreement between the Government and the Universal Radio Syndicate (statutes 1913, chapter 52), the syndicate agrees that the rates on messages between Montreal and the United Kingdom shall not exceed the following:—

- (a) Plain language messages, 8 cents per word.
- (b) Code messages, 16 cents per word.
- (c) Government messages, 5 cents per word.
- (d) Press messages, 4 cents per word.

OPERATION OF THE COAST STATION SERVICES.

The coast station services have been maintained at the regular standard of efficiency throughout the year. The amount of business handled by the East Coast system (operated by the Marconi Wireless Telegraph Company of Canada, Limited, under contract), shows a decrease from last year's business, amounting to 8,238 messages, containing 261,266 words; this decrease is entirely due to the reduced amount of traffic handled by the Pictou and Cape Bear stations, which last year handled 26,182 messages against 4,700 messages this year, a decrease of 21,482; the large amount of traffic handled in 1912 is accounted for by breakdown of the cable connecting Prince Edward Island with the mainland during that winter, when for several months all the telegraph business between the island and the mainland was handled via the Pictou-Cape Bear radiotelegraph route until repairs were effected to the cable in 1913.

The Great Lakes system (also operated by the Marconi Wireless Telegraph Company of Canada, Limited, under contract) shows an increase of 6,851 messages containing 167,364 words. Four new stations have been placed in commission during the present year, viz., Point Edward on lake Huron, Port Burwell on lake Erie, and Toronto and Kingston on lake Ontario.

The West Coast system (operated directly by this department) shows a most gratifying increase of 41,860 messages containing 687,405 words, or 36 per cent on the amount of business handled last year, the number of stations in operation remaining the same.

It might be remarked that the ten stations on the west coast handled more business than the thirty stations on the east coast and Great Lakes put together, the exact figures being:—

West coast.	157,354 messages.
East coast.	155,206 "

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COMPARATIVE STATEMENT of Business handled by the Coast Station Systems during the Last Five Years.

Service.	1909-10.		1910-11.		1911-12.		1912-13.		1913-14.		Comparison with 1912-13.	
	Messages.	Words.	Messages.	Words.	Messages.	Words.	Messages.	Words.	Messages.	Words.	Increase or Decrease.	Words.
East Coast.	65,608	956,370	71,594	1,179,434	119,049	1,824,450	153,843	2,704,411	145,605	2,443,145	Decrease.	261,266
Great Lakes	Nil.		Nil.		1,043	17,095	2,750	52,422	9,601	219,786	Increase.	167,364
West Coast	18,469	265,414	48,074	647,461	76,158	997,900	115,494	1,518,926	157,354	2,206,331	Increase.	687,405
Totals	84,077	1,221,784	119,668	1,826,895	196,250	2,839,445	272,087	4,275,759	312,560	4,869,262	Net Increase.	593,503

REVENUE.

The revenue accruing to the department from tolls on messages handled by the different stations continues to show a steady increase, and as in the past practically the whole of it is derived from the West Coast system, operated directly by the department.

The East Coast and Great Lakes systems are operated by the Marconi Wireless Telegraph Company of Canada, Ltd., under contract, under which they retain all tolls collected, with the exception of those received at the Grindstone Island, Que., station, which all accrue to the Government, and a certain percentage of those collected at the eight stations on the Great Lakes.

The total revenue collected during the year amounts to \$16,338.67, against \$10,420.48 last year; an increase of \$6,064.30 is shown by the West Coast, an increase of \$10.47 by the Great Lakes, and a decrease of \$156.58 by the East Coast.

The net increase over last year is \$5,918.19, or 56.8 per cent.

The decrease on the East Coast is due to the Grindstone Island station, which this year handled 1,633 paid messages, against 2,625 last year.

TABLE NO. 2.—Comparative Statement of Revenue Received by the Coast Station Services during the Past Five Years.

	1909-10.	1910-11.	1911-12.	1912-13.	1913-14.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
East Coast.....	Nil.	Nil.	229 57	475 00	318 42
Great Lakes.....	Nil.	Nil.	Nil.	17 08	27 55
West Coast.....	Nil.	3,108 63	4,484 77	9,928 40	15,992 70
Totals.....	Nil.	3,108 63	4,714 34	10,420 48	16,338 67

TABLE No. 3.—Detailed Statement of Business handled by the Ten Stations on the Pacific Coast Owned and Operated directly by this Department.

Name of Station.	Private business to and from Ships.		Private business between Stations.		Business to and from Government Ships.		Government business between Stations.		Service Messages.		Retransmitted Messages.	Cost of Maintenance.	Revenue.	
	Messages.	Words.	Messages.	Words.	Messages.	Words.	Messages.	Words.	Messages.	Words.				
Gonzales Hill (Victoria)	3,920	56,137	5,450	125,732	779	17,615	1,957	20,514	31,248	402,876	1,210	17,331	\$ cts. 4,204 47	
Pachena	205	2,981	72	998	46	922	30	661	2,914	23,157	10,198	158,423	4,390 73	
Estevan	1,876	23,225	24	405	51	1,201	42	775	4,426	43,232	17,850	263,383	4,851 10	
Dead Tree Point	6	100	1,283	18,215	11	219	26	726	2,133	18,201			1,782 06	
Ikeda Head	34	489	307	4,173	21	732	56	1,101	1,837	12,231	21	398	2,790 77	
Triangle Island	1,517	22,023	9	160	199	4,927	834	5,453	5,813	53,896	15,396	244,890	4,635 38	
Point Grey	2,899	41,183	2,621	47,577	111	1,982	574	4,909	9,212	138,872	24	315	3,718 51	
Digby Island (Prince Rupert)	1,436	18,506	5,514	141,722	216	4,997	660	10,297	3,196	33,665	2	26	4,262 63	
Cape Lazo	581	8,509	358	4,738	102	1,992	33	603	3,670	31,864	10,814	127,022	5,539 56	
Alert Bay	266	4,510	852	11,667	75	1,366	148	1,778	2,149	19,298	40	1,431	3,257 48	
District Office at Victoria, B.C.													5,184 73	
General Account (including charter of Steamers, Esquimalt, workshop, etc.)													4,068 66	
Total	12,740	177,663	16,490	355,387	1,611	35,953	4,360	46,817	66,598	777,292	55,555	813,219	48,931 02	15,992 70

Total number of messages handled	157,354
Total number of words handled	2,206,331
Total cost of maintenance of stations (including district office, workshop, etc.)	\$48,931.02
Total revenue	\$15,992.70

TABLE No. 4.—Detailed Statement of Business handled by the Eight Stations on the Great Lakes, owned by the Department of the Naval Service, and operated by the Marconi Wireless Telegraph Company, of Canada, Limited.

Name of Station.	Private Business to and from Ships.		Private Business between Stations.		Business to and from Government Ships.		Government business between Stations.		Service Messages.		Retransmitted Messages.		Cost of Maintenance.	Government percentage of Revenue.
	Messages.	Words.	Messages.	Words.	Messages.	Words.	Messages.	Words.	Messages.	Words.	Messages.	Words.		
Port Arthur.....	204	3,135	21	279	.....	.....	7	191	1,782	46,302	52	917	\$ 3,500 00	\$ cts. 5.60
Sault Ste. Marie.....	483	9,378	19	888	.....	9,338	147	4,305	2,259	55,187	733	12,563	3,500 00	14.88
Tobermory.....	16	181	7	74	.....	494	19	249	185	3,179	1,009	21,595	3,500 00	0.34
Midland.....	102	2,185	14	149	.....	2,427	140	3,998	588	13,804	92	1,909	3,500 00	3.31
Point Edward.....	154	2,686	12	240	.....	601	30	945	568	12,905	478	8,469	3,354 17	3.42
*Port Burwell.....	.....	.....	.....	.....	.....	.....	.....	.....	2	51	2	50	602 15	.....
*Toronto.....	.....	.....	2	22	.....	23	.....	.....	32	922	3	69	583 33	.....
*Kingston.....	.....	.....	.....	.....	.....	.....	.....	.....	1	76	.....	.....	344 41	.....
Total	959	17,565	75	1,652	438	12,883	343	9,688	5,417	132,426	2,369	45,572	18,884 06	27.55

Total number of messages handled.....	9,601
Total number of words handled.....	219,786
General Account.....	\$ 63.49
Total cost of maintenance.....	\$ 18,947.55
Total Revenue.....	\$ 27.55

* Placed in operation January, 1914.

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TABLE No. 5.—Detailed Statement of Business handled by the Four Stations on the East Coast owned and operated by the Marconi Wireless Telegraph Company of Canada, Limited, under contract with the Department of the Naval Service.

	Private Business to and from Ships.		Private Business between Stations.		Business to and from Government Ships.		Government business between Stations.		Service Messages.		Retransmitted Messages.		Cost of Maintenance.	Revenue.
	Messages.	Words.	Messages.	Words.	Messages.	Words.	Messages.	Words.	Messages.	Words.	Messages.	Words.	\$ cts.	\$ cts.
Sable Island	6,650	72,314	2,810	37,504	342	6,108	1,296	12,373	4,617	79,353				
Campetdown, Halifax	190	2,950	2,910	37,602	362	5,932	1,529	14,933	4,962	79,523				
North Sydney	47	680	24	431	314	7,071	2,784	19,259	1,672	32,590			1,750 00	
Pictou	9	273	1,092	46,103	515	10,321	14	366	374	7,829	37	1,162	1,750 00	
Total.	6,896	76,217	6,836	121,640	1,533	29,432	5,623	46,931	11,625	199,295	37	1,162	3,500 00	

Total number of messages handled

Total number of words handled

Total cost of maintenance

Total Revenue

32,550
474,677
83,500 00
Nil.

TABLE No. 6. Detailed Statement of Business handled by the Eighteen Stations in the Gulf and River St. Lawrence and East Coast, owned by this Department and operated by the Marconi Wireless Telegraph Co. of Canada, Ltd., under contract.

Name of Station.	Private Business to and from Ships.		Private Business between Stations.		Business to and from Government Ships.		Government business between Stations.		Service Messages.		Retransmitted Messages.		Cost of Maintenance.	Revenue.
	Messages.	Words.	Messages.	Words.	Messages.	Words.	Messages.	Words.	Messages.	Words.	Messages.	Words.		
Cape Sable.....	2,802	34,175	10	98	250	3,623	233	2,560	2,740	53,527	.....	.....	\$ 3,520 00	.....
St. John.....	30	442	2	15	694	15,318	430	7,518	567	9,509	.....	.....	3,500 00	.....
Cape Race.....	4,737	65,523	.....	.....	37	643	.....	.....	3,227	48,766	.....	.....	3,500 00	.....
Grindstone Island.....	3	34	1,630	57,322	43	866	771	3,346	847	8,872	482	7,835	1,200 00	318 42
Cape Bear.....	11	153	153	2,944	664	15,511	33	552	306	5,680	1,492	51,579	2,500 00	.....
Point Riche.....	62	829	24	420	258	4,418	15	184	948	13,272	5,866	90,273	3,500 00	.....
Point Amour.....	52	510	527	8,927	140	2,490	980	7,325	2,283	25,376	3,618	75,326	3,500 00	.....
Belle Isle.....	273	3,615	130	2,263	410	6,930	1,590	11,589	2,603	32,986	4,416	92,632	4,500 00	.....
Cape Ray.....	299	4,067	763	11,393	81	1,256	2,721	19,463	4,182	82,423	1,905	26,935	3,500 00	.....
Harrington.....	2	24	12	172	16	468	253	1,061	380	4,177	5	50	2,500 00	.....
Heath Point.....	296	3,160	26	713	320	6,170	848	6,417	3,544	37,270	10,146	163,127	3,500 00	.....
Fame Point.....	243	3,971	762	28,592	136	2,955	4,229	30,677	8,047	154,363	2,491	48,865	3,500 00	.....
Clarke City.....	96	3,907	2,221	109,166	95	1,928	212	1,811	1,708	21,617	1,822	39,291	3,500 00	.....
Father Point.....	757	13,706	1,507	63,808	249	6,384	499	4,904	3,153	46,749	195	6,528	3,500 00	.....
Grosse Isle.....	213	3,930	220	4,016	870	13,975	1,776	34,444	767	15,674	815	12,450	2,500 00	.....
Quebec.....	328	5,179	250	4,254	594	14,357	1,776	34,444	2,537	28,231	346	4,854	2,500 00	.....
Three Rivers.....	210	2,299	5	84	247	2,612	95	1,810	330	6,393	1,477	25,230	3,500 00	.....
Montreal.....	244	3,378	30	444	33	1,116	3	50	879	15,870	.....	.....	3,500 00	.....
Total.....	10,658	148,902	8,272	294,631	5,137	101,020	16,464	168,155	38,048	600,775	34,476	644,985	57,720 00	\$318.42

Total number of messages handled.....	113,055
Total number of words handled.....	1,958,368
Total cost of maintenance.....	\$57,720 00
Total Revenue.....	\$ 318.42

SESSIONAL PAPER No. 38

EXAMINATIONS FOR CERTIFICATES OF PROFICIENCY IN RADIOTELEGRAPHY.

Under the terms of the licenses issued for the installation and operation of radiotelegraph equipments on board Canadian ships, and in accordance with the provisions of article X of the Regulations annexed to the International Radiotelegraph Convention, radiotelegraph operators must be the holders of a certificate of proficiency in radiotelegraphy.

Examinations are accordingly held from time to time in different parts of the Dominion by the departmental inspectors, when they are making the regular semi-annual inspections of the different stations.

A nominal examination fee of one dollar is charged, and the examination covers the following subjects:—

1. Sending: At a speed of 20 words a minute on a Morse key; maximum marks allowed, 100; minimum required to pass, 100.
2. Receiving: By sound; 20 words a minute in the Continental Morse code; maximum marks allowed, 100; minimum required to pass, 100.
3. Practical: The adjustment of apparatus, location of faults, etc. Maximum marks allowed, 100; minimum required to pass, 75.
4. Technical: Seven questions on the apparatus, principles governing its working and its proper care. Maximum marks allowed, 100; minimum required to pass, 75.
5. Handling of Traffic: Nine questions on the rules governing the method of operation of a station, the checking of messages, etc. Maximum marks allowed, 100; minimum required to pass, 75.
6. Diagram of Connections: The completion of a diagram of connections of the set on which the candidate is being examined. Maximum marks allowed, 100; minimum required to pass, 50.

The detailed list of the subjects covered by the examination is given in the "Regulations" issued under the "Radiotelegraph Act."

Sixty-three candidates were examined during the year, of whom thirty-six were successful and twenty-seven failed.

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SUCCESSFUL CANDIDATES for Certificates of Proficiency in Radiotelegraphy.

Number of Certificate.	Date of Certificate.	Name.	Grade of Certificate.	Where Examination held.
1.....	Mar. 28, 1912.	P. VanKoenig.....	1st Class. . .	Ottawa, Ont.
2.....	Mar. 8, 1913.	S.C. White	" ..	Victoria, B.C.
3.....	May 17, 1913.	L. R. Johnstone.....	" ..	Camperdown, N.S.
4.....	May 17, 1913.	A. H. Inder.....	" ..	Camperdown, N.S.
5.....	May 19, 1913.	J. C. Surgey.....	" ..	Cape Sable, N.S.
6.....	May 19, 1913.	D. Ross.....	" ..	Cape Sable, N.S.
7.....	May 23, 1913.	S. C. Rose.....	" ..	Quebec, P.Q.
8.....	May 23, 1913.	J. M. Colton.....	" ..	Quebec, P.Q.
9.....	May 24, 1913.	F. C. Allen.....	" ..	Three Rivers, P.Q.
10.....	May 24, 1913.	A. E. Argue.....	" ..	Montreal, P.Q.
11.....	May 24, 1913.	M. J. King.....	" ..	Montreal, P.Q.
12.....	June 9, 1913.	W. J. Whiteside.....	" ..	Father Point, P.Q.
13.....	June 9, 1913.	J. E. O. Lemieux.....	" ..	Quebec, P.Q.
14.....	Aug. 18, 1913.	H. M. Moffatt.....	" ..	North Sydney, C.B.
15.....	Aug. 18, 1913.	E. H. Holderness.....	" ..	North Sydney, C.B.
16.....	Sept. 25, 1913.	D. R. P. Coates.....	" ..	Ottawa, Ont.
17.....	Oct. 6, 1913.	D. Manson.....	" ..	Point Edward, Ont.
18.....	Oct. 6, 1913.	J. C. R. Godwin.....	" ..	Point Edward, Ont.
19.....	Oct. 11, 1913.	C. R. Fraser.....	" ..	Sault Ste. Marie, Ont.
20.....	Oct. 11, 1913.	C. F. Griffin.....	" ..	Sault Ste. Marie, Ont.
21.....	Oct. 21, 1913.	J. H. Bartlett.....	" ..	Port Arthur, Ont.
22.....	Dec. 27, 1913.	G. E. Clegg.....	" ..	Ottawa, Ont.
23.....	Feb. 10, 1914.	H. W. Tee.....	" ..	Victoria, B.C.
24.....	Feb. 10, 1914.	E. J. Myrick.....	" ..	St. John, N.B.
25.....	Feb. 10, 1914.	W. R. Peake.....	" ..	St. John, N.B.
26.....	Feb. 16, 1914.	F. Oates.....	" ..	Halifax, N.S.
27.....	Feb. 20, 1914.	J. Brennan.....	" ..	North Sydney, N.S.
50.....	Feb. 21, 1914.	J. M. Wilson.....	" ..	Louisburg, C.B.
28.....	Feb. 24, 1914.	G. F. Harris.....	" ..	Father Point, P.Q.
29.....	Feb. 25, 1914.	J. A. P. Beaulieu.....	" ..	Quebec, P.Q.
30.....	Feb. 25, 1914.	R. G. Newman...	" ..	Quebec, P.Q.
31.....	Feb. 16, 1914.	T. Strickland.....	" ..	Halifax, N.S.
32.....	Feb. 20, 1914.	P. M. Stewart.....	" ..	N. Sydney, N.S.
33.....	Feb. 10, 1914.	E. Snider.....	" ..	St. John, N.B.
34.....	Feb. 20, 1914.	D. V. Dooley.....	" ..	N. Sydney, C.B.
35.....	Mar. 25, 1914.	H. W. Dawson.....	" ..	Ottawa, Ont.

RECIPROCITY IN OPERATORS' CERTIFICATES.

In order that any certificated operator of British nationality may be permitted to work on board any vessel of British register, irrespective of what part of the Empire she may be registered in, it has been arranged by mutual consent between the Imperial Government and the Colonial Administrations, that the holder of a certificate of proficiency in radiotelegraphy issued by His Majesty's Postmaster General, or by the corresponding Authority in any other part of the Empire, shall be permitted to work the radiotelegraph apparatus on board any British ship, irrespective of the place of her registry. Under this arrangement Canadian operators are now in a position to accept employment as such in any British ship.

NEW CONSTRUCTION, ADDITIONS, AND ALTERATIONS.

EAST COAST.

No construction was undertaken on the east coast during the year.

Quebec.

A suitable site for the proposed enlarged station at Quebec was secured on the Glacis, to the west of the Citadel. The Department of Militia and Defence, which

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has the control of this property, granted the necessary permission, but owing to the objections raised to this location by the citizens of Quebec, the work has not been proceeded with.

Montreal.

Negotiations are still in progress for the acquirement of a suitable site for the enlarged station which it is proposed to erect at this point.

GREAT LAKES.

Port Arthur.

Second Mast.—Public tenders were invited for the erection of a second standard 185-foot housing mast, and transfer of the No. 1 mast at this point. The contract was awarded to the Marconi Wireless Telegraph Company of Canada, Limited, Montreal, who submitted the lowest tender of \$3,645.

The work was completed, and a new standard T aerial installed and placed in commission by the opening of navigation, 1913.

New Operating-house.—Public tenders were invited for the erection of a type No. 4 brick operating-house, 40 feet by 20 feet, to accommodate a standard duplicate 5½-k.w. set of apparatus. The contract was awarded to Messrs. Pratt & Hanley of Midland, Ont., who submitted the lowest tender of \$3,300.

Alterations to Old Operating-house.—The old operating-house was converted into a dwelling-house for the accommodation of the station staff. The inside partitions were rearranged, the second story fitted up for bed-rooms, and a hot-air furnace installed in the basement.

The cost of the above work amounted to \$558.

Apparatus.—A complete standard duplicate set of apparatus, consisting of two motor driven 5½-k.w. 240-cycle, synchronous disc transmitters, with all necessary auxiliary apparatus, together with a gasoline engine, to be used as an emergency source of power, and a complete receiving equipment was installed.

The contract for this work was awarded to the Marconi Wireless Telegraph Company of Canada, Limited, for the sum of \$6,254.44.

The complete new station was placed in commission on August 25, 1913.

Sault Ste. Marie.

The well, cesspool, and necessary drainage thereto were installed at the Sault Ste. Marie station; the cost of this work amounted to \$382.25.

Port Burwell.

New Station.—A complete new station, consisting of a type No. 2 operating-house, 40 feet by 20 feet, two 185-foot housing masts, and a duplicate 10-horsepower 5½-kw. radiotelegraph equipment was established at Port Burwell on lake Erie, during the year at a total cost of \$22,490.34.

Public tenders were invited for the erection of the two masts, the operating and the dwelling-house, and the contract was awarded to Messrs. McFarlane, Pratt & Hanley of Toronto, who submitted the lowest tender of \$12,650 for this work.

The radiotelegraph equipment consists of two 5½-k.w. 240-cycles, synchronous disc transmitters, with all necessary auxiliary apparatus, each generator being belt-connected to a 10-horsepower Canadian Fairbanks Morse gasoline engine.

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The receiving equipment consists of a tuner capable of receiving all wave lengths between 200 and 3,000 metres, and a carborundum crystal detector.

The contract for the installation of the above apparatus was awarded to the Marconi Wireless Telegraph Company of Canada, Limited, for the sum of \$7,106.

The station has a normal range of 350 nautical miles over water.

Work was completed, and the station placed in commission in January, 1914.

Toronto Island.

New Station.—An excellent site having been secured on the Marine and Fisheries reserve at Toronto island, a complete new station, consisting of a type No. 3 operating-house, 40 feet by 30 feet, two 185-foot housing masts and a duplicate 10-horsepower 5½-kw. radiotelegraph equipment, was established during the year at a total cost of \$22,352.76.

Public tenders were invited for the erection of two masts and the operating and dwelling-houses, and the contract was awarded to Messrs. McFarlane, Pratt & Hanley of Toronto, who submitted the lowest tender of \$12,650 for this work.

The radiotelegraph equipment consists of two motor-driven 5½-k.w. 240-cycle, synchronous disc transmitters, with all necessary auxiliary apparatus, together with a gasoline engine to be used as an emergency source of power, and a complete receiving equipment. The contract for the installation of the above apparatus was awarded to the Marconi Wireless Telegraph Company of Canada, Limited, for the sum of \$6,964.

Owing to the small elevation of the site above the maximum lake level, it was necessary to commence the foundations practically on the surface, and a large amount of grading was required to protect the foundations and give a finished appearance to the buildings. It is proposed to sod this grading during the coming year.

Work was completed and the station placed in commission in January, 1914.

Kingston.

A suitable site for this station was secured on the Militia and Defence reserve on Barriefield Common, and a complete new station consisting of a type No. 2 operating-house, 40 feet by 20 feet, two 185-foot housing masts and a duplicate 10-horsepower 5½-kw. radiotelegraph equipment, was established during the year, at a total cost of \$21,534.28.

Public tenders were invited for the erection of two masts and the operating and dwelling-houses, and the contract was awarded to Messrs. McFarlane, Pratt & Hanley, of Toronto, who submitted the lowest tender of \$12,650 for the work.

The radiotelegraph equipment consists of two 5½-k.w. 240-cycle synchronous disc transmitters, with all necessary auxiliary apparatus, each generator being belt connected to a 10-horsepower Canadian Fairbanks Morse gasoline engine.

The receiving equipment consists of a tuner capable of receiving wave lengths between 200 and 3,000 metres, and a carborundum crystal detector.

The contract for the installation of the above apparatus was awarded to the Marconi Wireless Telegraph Company of Canada, Limited, for the sum of \$7,106.

The station has a normal range of 350 nautical miles over water.

Work was completed and the station placed in commission in January, 1914.

WEST COAST.

Alert Bay.

The new station at this point, work on which was commenced in 1912, was placed in commission in January, 1913, though the whole of the work, which included the erection of the second mast, was not finally completed until June, 1913.

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The station consists of a standard double dwelling-house, a type No. 2 operating-house, two masts, and a duplicate set of apparatus.

The main transmitting apparatus is a $5\frac{1}{2}$ -k.w. 240-cycle synchronous disc transmitter, belt-connected to a 10-horsepower Canadian Fairbanks Morse gasoline engine, and the duplicate set is a 2-kw. synchronous disc, 120-cycle transmitter, belt-driven by a 6-horsepower engine. This transmitter was made up in our Esquimalt workshop and has proved extremely efficient and satisfactory.

The proportion of the cost of the above work, charged to the present year, amounts to \$3,203.09.

Cape Lazo.

An additional 2 acres of the site were stumped, cleared, and ploughed, and a well was sunk.

The Point Grey windmill was dismantled and re-erected at Cape Lazo, and it is now arranged so as to pump water from a new well into a tank which provides a water supply for the two buildings.

Work has also been commenced on the installation of a septic tank and permanent anchors for a No. 2 mast.

The cost of the above charged to the present year, amounts to \$856.70.

Estevan.

A convenient tree, 190 feet high, was limbed and converted into a second mast, which permitted the installation of a standard T aerial.

The old operating-house was thoroughly overhauled and the interior arrangements changed to convert it into a dwelling for the second operators.

A further ground connection was installed in connection with the new operating-house, and showed improvement in the transmitted signals.

The cost of the above work amounted to \$403.18.

Gonzales Hill.

Concrete foundations were installed for the disc motors and proved effective in eliminating noise and vibrations. A complete duplicate transmitter, including a new aerial inductance, oscillation transformer and disc discharger was made up and placed in commission.

A further ground connection consisting of one mile of No. 8 galvanized telegraph wire was installed and found to improve the transmitted signals.

The site was cleaned up and the line between the two masts cleared and brushed. The cost of the above work amounted to \$718.28.

Ikeda Head.

Three permanent mast anchors were installed in place of the tree stumps heretofore used.

The cost of the above work is charged to maintenance.

Pachena.

A further ground connection, consisting of 1 mile, No. 8 galvanized telegraph wire was installed, and was found to improve the transmitted signals.

The cost of the above work amounted to \$21.57.

Triangle Island.

The operating and dwelling houses were thoroughly overhauled and the roofs re-shingled where damaged in the gales of last winter.

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The dwelling-house porch was boarded in, and buttresses on concrete foundations were installed to afford additional protection from the extremely heavy gales which prevail at this point.

The mast and field poles were overhauled and placed in good condition.

A new receiving equipment, consisting of a valve type tuner and crystal detector was installed.

The cost of the above work amounted to \$1,482.54.

Point Grey.

The engine-room floor was tiled and some of the material appertaining to two standard masts which will be erected at this station during the coming year was purchased.

The total cost of the above work amounted to \$379.30.

At the present time a standing Douglas fir tree is being used as a support for the aërial. In spite of the fact that it is some 12 feet in diameter at the butt, it is becoming seriously affected by dry rot in the centre, and is considered unsafe. As soon as the two new masts are installed, this tree will be taken down.

HUDSON BAY AND STRAITS.

The Department of Railways and Canals have installed a station at Port Nelson, the Bay terminus of the Hudson Bay railway, which communicates with a similar station at Le Pas, Man., the other terminus of that railway, 400 miles distant.

This service provides the only means of communication between Hudson bay and civilization, and has already proved to be of immense utility.

These stations were installed in accordance with plans and specifications drawn up by this branch, the successful tenderers for the masts and apparatus being the Marconi Wireless Telegraph Company of Canada, Limited.

The service was placed in commission in February, 1914, and constant communication has been maintained since that date.

The official acceptance test of the Le Pas equipment has been made by one of our officers, and similar tests will be undertaken in connection with the Port Nelson equipment during the coming summer.

Location of Sites.

The increasing use of Hudson straits as a route of navigation renders the installation of radiotelegraph facilities in that vicinity necessary in the near future.

The strategical points for such stations appear to be as follows:—

(1) A station at the western entrance of Hudson strait, either at cape Wolstenholme, Mansel island or Coats island, to communicate with Port Nelson on the southwest and a station in the vicinity of the middle of the straits to the eastward.

(2) A station near the centre of the straits on Charles island or in the vicinity of Ashe inlet to communicate with station No. 1 to the westward and a station on Button islands to the eastward.

(3) A station on the Button islands, or in the vicinity of cape Chidley to communicate with station No. 2 to the westward and with incoming ships to the eastward.

An engineer was despatched to Hudson strait in the S.S. *Beothic* last summer, and locations in the vicinity of cape Wolstenholme and Ashe inlet were reported on.

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A suitable site was located at the latter point, but cape Wolstenholme and Digges island proved to be untenable.

Up to the present no site has been secured for the station which it is proposed to erect in the vicinity of the western end of the strait.

Mansel island would appear to present the best facilities for our purpose, and that island, together with Charles island and the Button islands will be visited and reported on during the coming summer.

In view of the extreme isolation of Hudson straits, it will be well to postpone any definite settlement as to the location of the proposed stations until the position of the lighthouses has been decided on, in order that the stations and lighthouses may be installed close together, their staffs thus providing companionship for one another. The efficiency of a radiotelegraph station, provided a good site is available, is not greatly affected by shifting it 20 miles one way or the other, whereas a lighthouse must be fixed on one special strategical point. In the meantime we are steadily collecting data with reference to all suitable sites in the above-mentioned localities and should be in a position to proceed with work if called on to do so in 1915.

ASSISTANCE RENDERED TO SHIPS DURING THE FISCAL YEAR BY THE GOVERNMENT
RADIOTELEGRAPH SERVICE.

West Coast.

S.S. *Spokane*.—On October 3, 1913, at 9.20 p.m., the S.S. *Spokane* stranded 15 miles north of cape Lazo; sent out the distress signal, which was at once answered by cape Lazo; communication was immediately established.

S.S. *Carlos*.—On 4th December, 1913, at 2.55 p.m., the Pachena station received the distress signal from the S.S. *Carlos*, 20 miles south of cape Flattery. The signal was also received by Triangle island, Estevan, and Tatoosh, communication being immediately established with the vessel.

S.S. *Prince Albert*.—On 22nd May, 1913, at 3.55 a.m. the S.S. *Prince Albert* ran ashore in Port Simpson; communication was immediately established with the Digby island (Prince Rupert, B.C.) station.

S.S. *Zapora*.—On 31st May, 1913, at 5.40 p.m. the S.S. *Zapora* ran ashore 8 miles north of Dead Tree point; communication was immediately established with the Digby Island and Dead Tree Point stations.

S.S. *Princess Royal*.—On 4th December, 1913, at 3.05 a.m., the S.S. *Princess Royal* ran ashore in thick fog; communication immediately established with Point Grey.

S.S. *Prince George*.—On 20th December, 1913, at 7.15 p.m., the S.S. *Prince George* ran ashore during thick fog; communication established with Point Grey.

Schooner *Garmes*.—On 14th January, 1914, at 9.40 a.m., the Triangle Island station sighted the schooner *Garmes* dismasted; communication established with tug *Goliath*, which proceeded to disabled vessel, taking it in tow. United States revenue cutter *Snohomish* also advised; she proceeded north and picked up captain and men in small boat.

S.S. *Princess Sophia*.—On 25th January, 1914, at 11.55 p.m., the S.S. *Princess Sophia* ran aground off Mountain point; communication immediately established with the Alert Bay station.

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East Coast.

S.S. *Beothic*.—On 23rd July, 1914, the S.S. *Beothic* stranded in the gulf of St. Lawrence; communication was immediately established with the Point Riche station.

S.S. *Volturmo*.—On 11th October, 1913, the S.S. *Volturmo*, 800 miles east of Cape Race, caught fire; communication established between that station and ships in the vicinity of the *Volturmo*.

S.S. *Balmes*.—On 13th November, 1913, the S.S. *Balmes*, bound from Havana to Cadiz, caught fire; the S.S. *Panonia* went to her assistance; Cape Race overheard communication in connection with disaster, and reported in accordance with standing instructions.

S.S. *Cobequid*.—On 13th January, 1914, the S.S. *Cobequid* ran aground on the Trinity ledges in the Bay of Fundy, in dense fog. The distress call was sent out and communication immediately established with the Cape Sable station.

S.S. *City of Sydney*.—On 17th March 1914, the S.S. *City of Sydney* ran ashore off Cape Sambro. Communication was immediately established with the Camperdown station.

Great Lakes.

During November there occurred one of the worst storms in the history of the Great Lakes. No vessels equipped with radiotelegraph apparatus met with any accident.

Several ships grounded at different points on the Great Lakes during the season, but at no time were any of these vessels in a serious position, and on every occasion communication was immediately established with one or other of the coast stations of the Great Lakes system.

THE RADIOTELEGRAPH ACT (CHAPTER 43, STATUTES 1913).

The Radiotelegraph Act, introduced by the Minister of the Naval Service in the session of 1912-13, finally became law on the 6th of June, 1913. One of its most important sections is No. 4, which provides for the compulsory equipment of radiotelegraph apparatus on board certain vessels, but which did not become effective until January 1, 1914, in order that shipping companies might have ample time to install the necessary equipments. Some forty-one Canadian vessels were affected by this section, most of them being, however, already provided with the necessary apparatus before the Act was introduced.

REGULATIONS ISSUED UNDER THE ACT.

The regulations which will be issued under the Act have been drafted and will be published immediately. They are intended to supplement the provisions of the Act and, in conjunction with it, to provide for an absolute control of all radiotelegraph work in the Dominion.

The regulations dealing with: (1) The classification of ship stations; (2) The operators to be carried; and (3) The watches to be maintained, are of particular interest, and a synopsis of these follows:—

CLASSIFICATION OF SHIPS.

Class 1.

Constant Watch: Two First-class Operators.—1. All “sea-going” passenger vessels with an average speed of 15 knots or more, carrying fifty or more persons, and plying between ports more than 200 miles apart.

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2. All "sea-going" passenger vessels with an average speed of 13 knots or more, carrying two hundred or more persons, and plying between ports more than 500 miles apart.

Class 2 (a).

Limited Watch: One First-class and One Second-class or Third-class Operator.—All "sea-going" passenger vessels affected by section 4 of the Radiotelegraph Act which do not come under class 1.

Class 2 (b).

Special Watches as Specified in the Regulations: One First-class Operator.—All passenger vessels affected by section 4 of the Radiotelegraph Act, plying on "coasting voyages" or on the "inland waters" of Canada.

Class 3.

No Fixed Watch: One First or One Second-class Operator.—All vessels not affected by section 4 of the Radiotelegraph Act, but which have been voluntarily equipped with radiotelegraph apparatus.

ENFORCEMENT OF SECTION IV.

Arrangements have been made with the Department of Customs to have their collectors at the different ports act as agents of the department for the enforcement of the provisions of this section. They will ascertain whether vessels affected thereby are provided with the necessary apparatus and operators called for, and will notify the Deputy Minister of the Naval Service in case of any violation. A circular (H.Q. No. 2) has been issued for their guidance in this respect.

The regular inspection of ship equipments will be conducted, as heretofore, by the technical officers of this branch, who, when such sets are found to comply with the terms of the license issued therefor, will issue an "inspection certificate" certifying that the installation is satisfactory.

In the absence of any reason to believe otherwise, Collectors of Customs will accept this inspection certificate as proof that the vessel is complying with the Radiotelegraph Act.

INTERNATIONAL CONFERENCE FOR THE SAFETY OF HUMAN LIVES AT SEA.

In December, 1913, an International Conference was held in London, England, to consider the establishment and enforcement of uniform regulations for the proper safeguarding of human lives at sea, to which representatives of all the leading countries of the world were invited, Alexander Johnston, Esq., Deputy Minister of Department of Marine and Fisheries representing the Dominion of Canada.

Many and varied questions and means were discussed at this conference, and as radiotelegraphy naturally plays a very important part in connection with the safeguarding of lives at sea, it was given very careful consideration.

After a very full discussion the Convention was finally signed in January, 1914, by the following Powers: Great Britain, Canada, Australia, New Zealand, Belgium, Denmark, France, Spain, Holland, Russia, Sweden, Germany, Austria, United States of America, Italy, and Norway.

Section 4 of the Convention deals exclusively with radiotelegraphy, and a synopsis of its provisions follows:—

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Compulsory Equipment of Certain Vessels with Radiotelegraph Apparatus.

Every vessel carrying fifty or more persons must (unless specifically exempted under the conditions set out below) carry a radiotelegraph installation. Any Administration may, however, at its discretion authorize the following exceptions:—

(1) Ships plying on voyages which do not take them more than 150 miles from the shore.

(2) Ships on which the number of persons is temporarily increased beyond fifty persons by reasons of exceptional circumstances.

(3) Ships of primitive build on which it would be practically impossible to install an equipment.

Watches.

The classification of the vessel determines the watches which must be maintained at the station on board her, as follows:—

Class I: Constant Watch.—All vessels carrying twenty-five passengers or more must maintain a constant watch,

(I) if they have an average speed of more than 15 knots;

(II) if they have an average speed of more than 13 knots, have more than two hundred persons on board and ply between ports more than 500 miles apart.

Class II: Limited Watch.—Vessels carrying twenty-five passengers, which are not already covered by Class I, must maintain a constant watch for seven hours each day and for the first ten minutes of every other hour of the day.

Class III: No Fixed Watch.—Vessels not covered by classes I and II are not required to maintain any regular watch.

The provisions of classes I and II come into effect within one year, and those of class III within two years, after the date the Convention was signed.

General.

The main and emergency equipments are to be as called for under the International Radiotelegraph Convention of 1912.

Rules are included for the guidance of the captain of a vessel which receives a call of distress.

Provision is made for the reporting and dissemination of information regarding ice, derelicts, and other menaces to navigation; in this connection it might be remarked that our Cape Race station occupies a strategical point, on the North Atlantic, and will probably prove to be the chief bureau for the exchange of such information.

The provisions of the sections of the Convention, dealing with the compulsory installation of radiotelegraph apparatus on board certain ships, do not coincide with those of the corresponding section of the Canadian Radiotelegraph Act (section 4); the latter does not affect vessels which are not licensed to carry passengers, so that, before the terms of the Convention can be put into force in the Dominion in their entirety, it will be necessary to amend the above-mentioned section of our Radiotelegraph Act to cover all classes of vessels, *i.e.*, passengers and others.

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PERSONNEL.

The personnel of the radiotelegraph service in the Dominion is as follows:—

	Commercial ship and land stations.	East Coast and Great Lakes.	West Coast.	Government ships.
Engineers and officers in charge.....	63	32	12	21
Operators.....	13	68	20	—
Other employees.....	50	—	8	—
Executive officials and Inspectors..... 9				
9	126	100	40	21

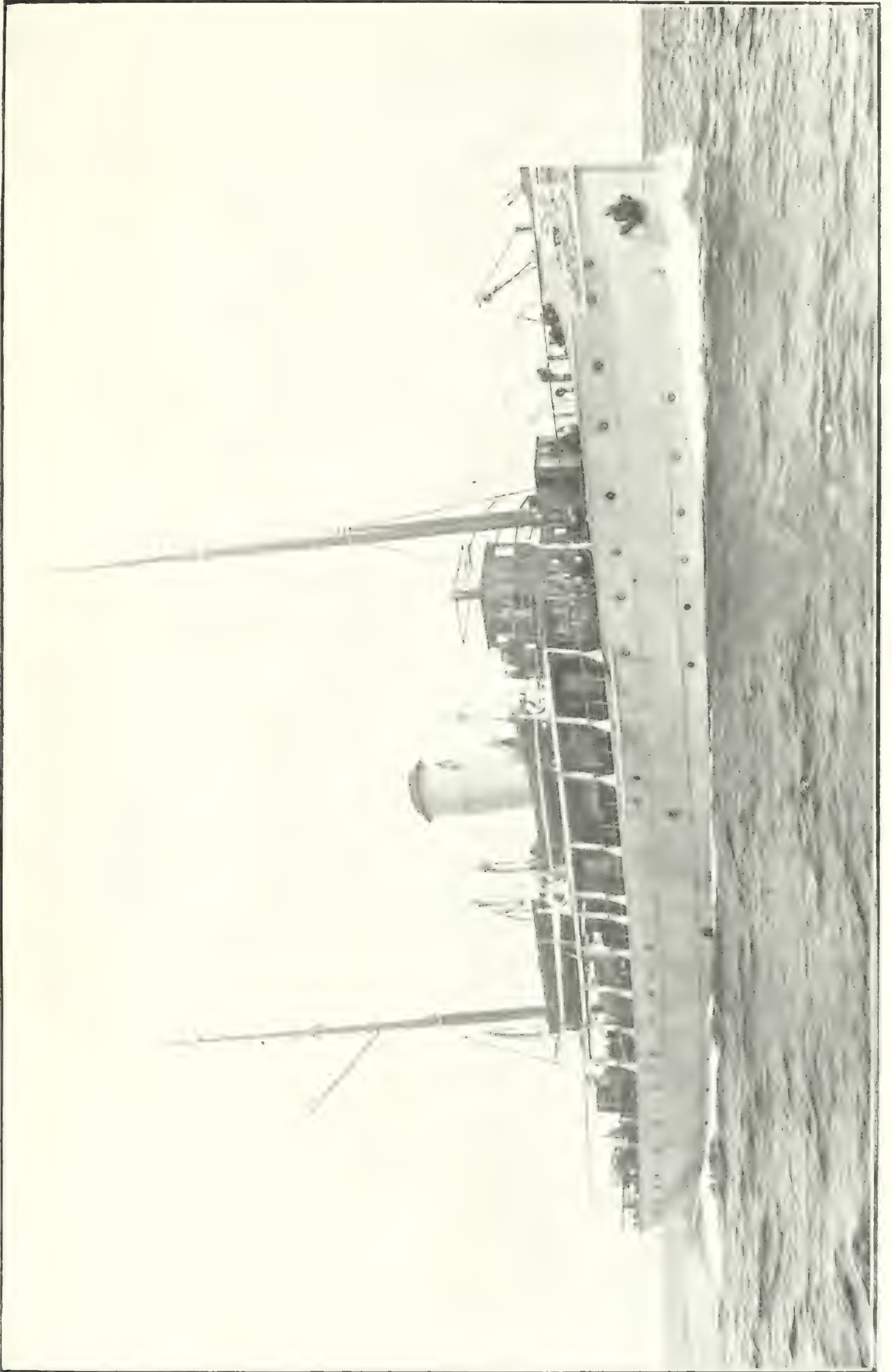
Total of personnel.....296.

STAFF.

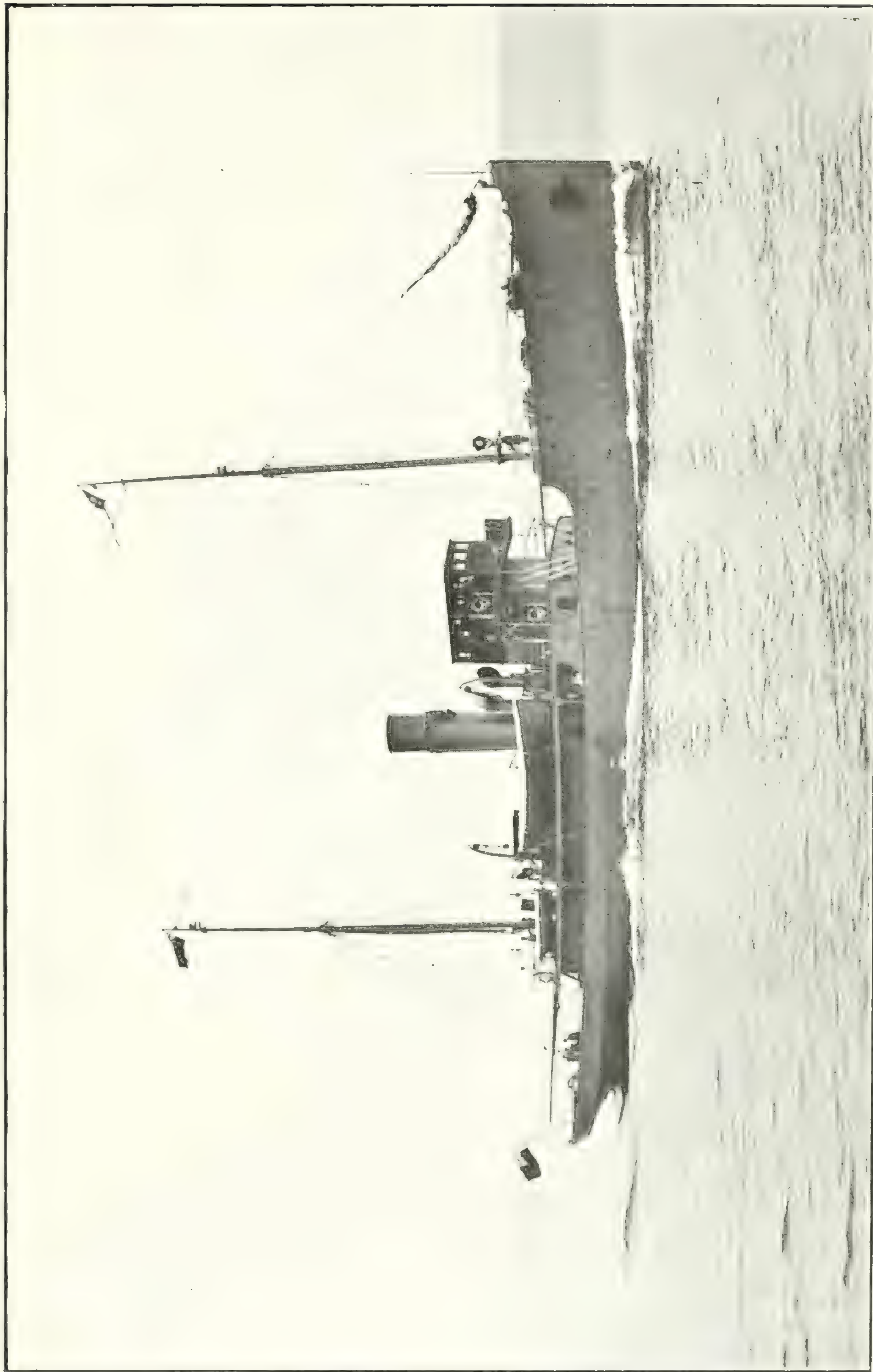
As regards the staff directly in the employ of this department at Headquarters, at the British Columbia coast stations, and on board departmental ships, I am pleased to report that they show great interest in their work and have carried out their duties in a satisfactory and efficient manner. Great praise is due the West Coast staff who have handled a large amount of business, and in particular, to the District Superintendent and the Officers in charge who, through their personal efforts, have contributed to the large increase in revenue during the year.

I have the honour to be, sir,
Your obedient servant,

C. P. EDWARDS,
General Superintendent Government Radiotelegraph Service.



U.S.S. ALBATROSS



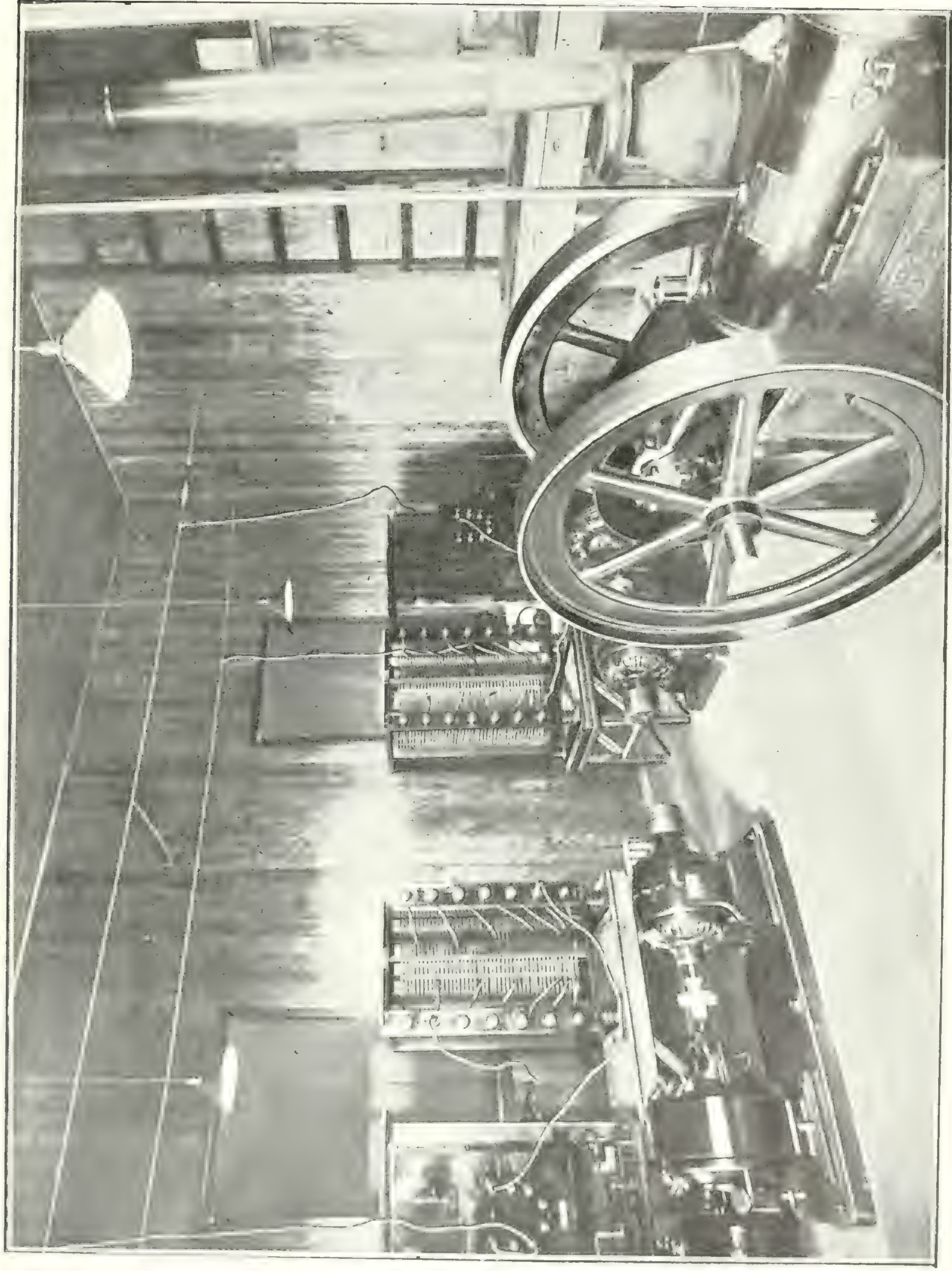
C. G. S. "MALASPINA."



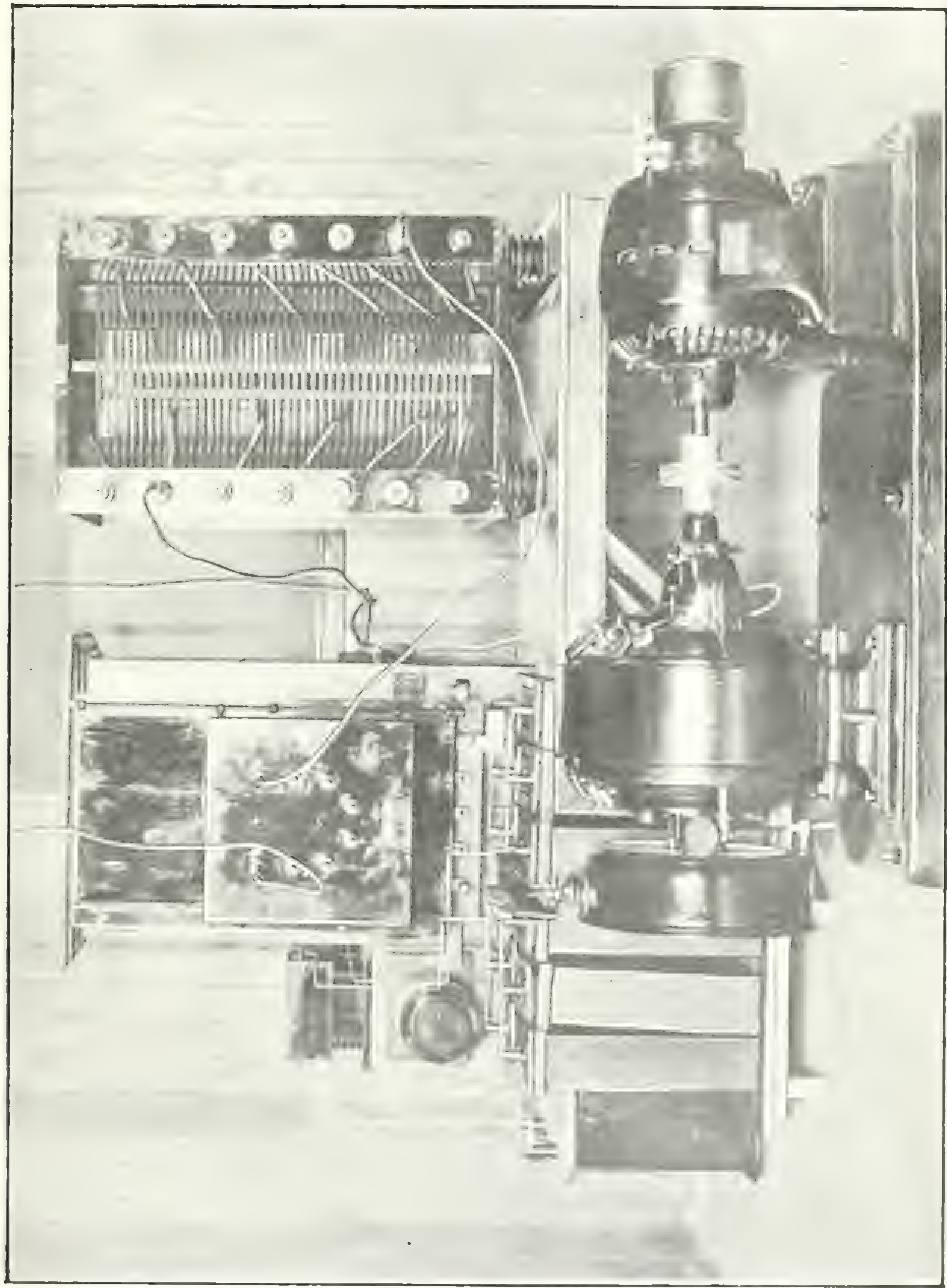
Type No. 3. Operating house of a modern radiotelegraph station. (Canadian Government Station at Port Arthur, Ontario.)



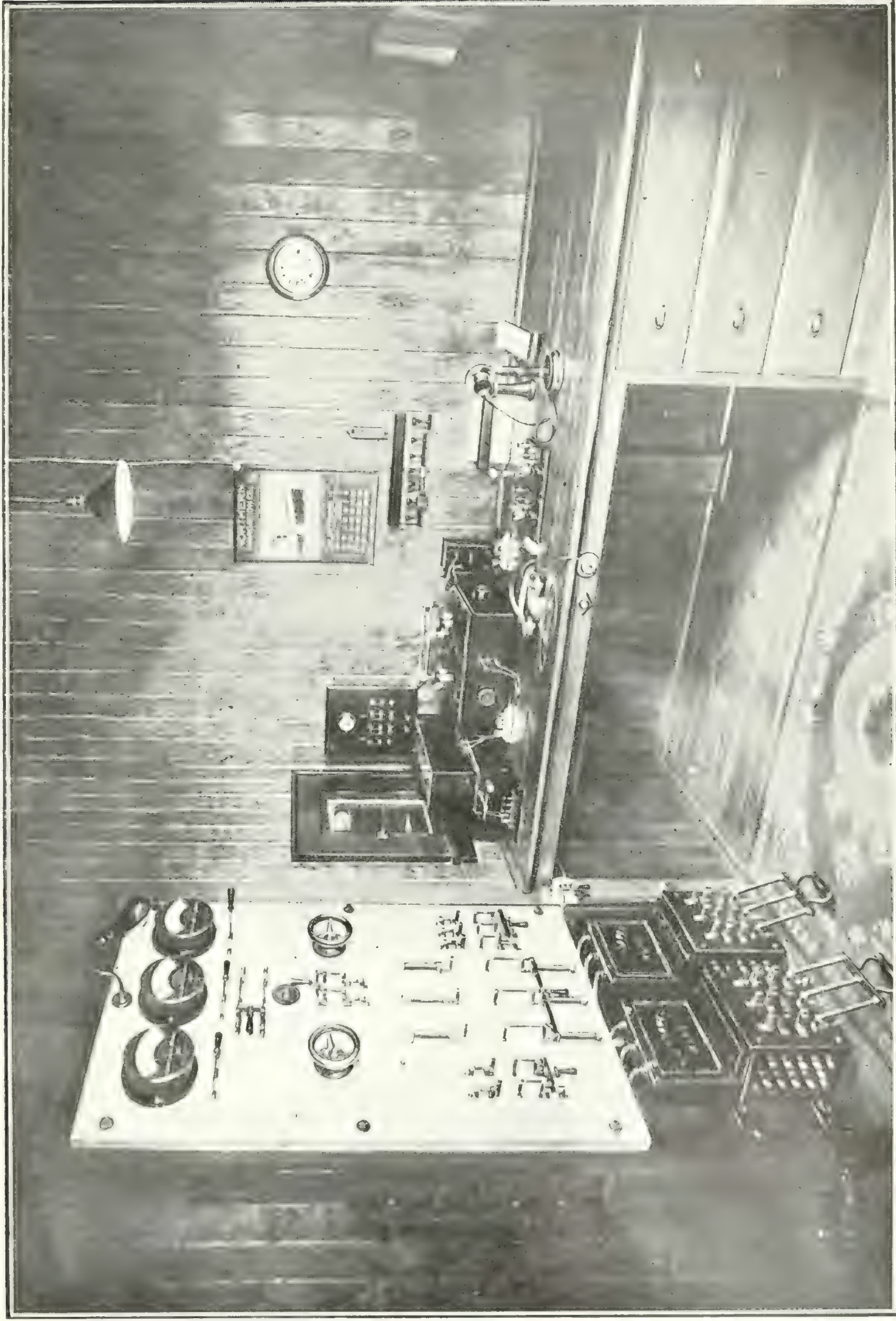
View of a modern Radiotelegraph Station. (The Canadian Government Station at Port Arthur, Ontario.)



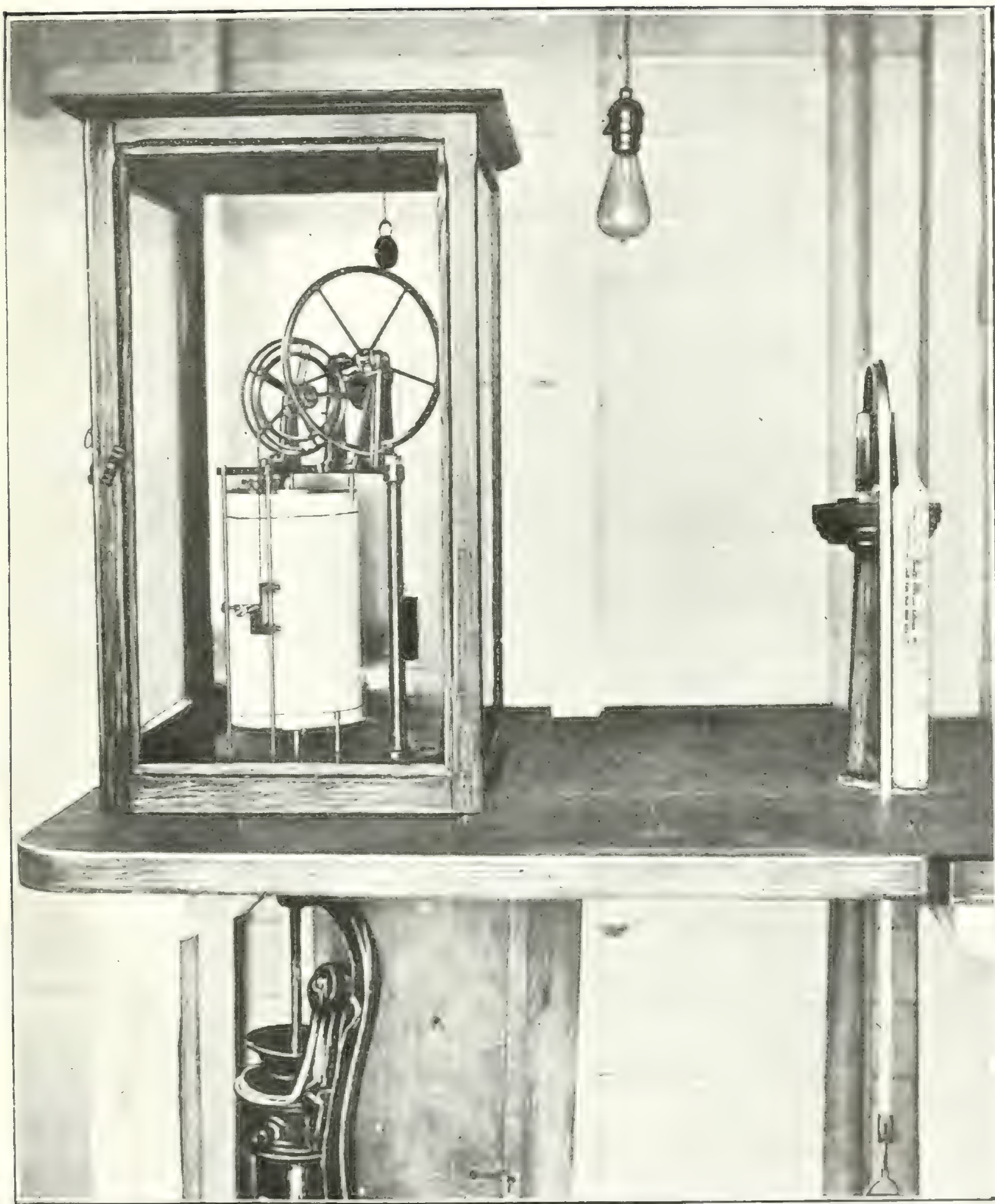
The engine room and generators of a modern Radiograph Station. (Canadian Government Station at Port Arthur, Ontario.)



Complete demonstration apparatus of a modern K. telegraph system. (The Canadian Government Station at Port Arthur, Ontario.)



The interior of a modern Radiotelegraph Station. (The Canadian Government Station at Port Arthur, Ontario.)



THE TIDE RECORDING INSTRUMENT.

The instrument by which the tide curves are recorded, and the sight gauge by which the tide levels are obtained. At Charlottetown, P.E.I., a principal tide station.

